Mini System **FW880/02, FW880P/21/21M/22/34**

FW880W/21/21M/22/34

PHIL -05242

Service
Service
Service

For repair information on the Wireless Surround Speaker Box, see Service Manual "Wireless Surround Set FB207W" or "Wireless Surround Set FB209W"

Service Manual

COMPACT disc DIGITAL AUDIO

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CLASS 1
LASER PRODUCT

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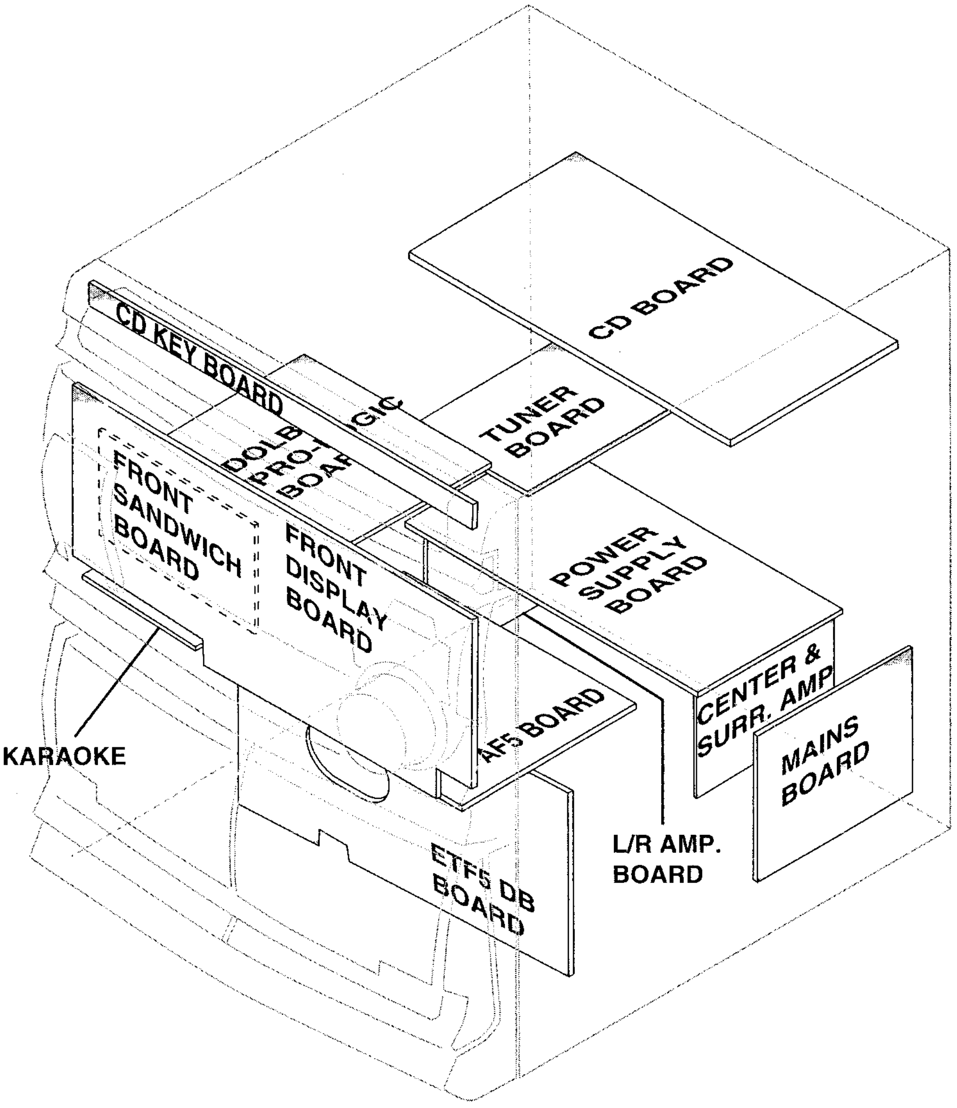
PHILIPS

5242

LOCATION OF PRINTED CIRCUIT BOARDS


CD BOARD
CD KEY BOARD
DOLB GIC
PRO-
BOA
TUNER BOARD
FRONT SANDWICH BOARD
FRONT DISPLAY BOARD
POWER SUPPLY BOARD
CENTER & SURR. AMP
MAINS BOARD
AF5 BOARD
KARAOKE
L/R AMP. BOARD
ETF5 DB BOARD

VERSION VARIATIONS:

Versions / Features & Board in used:	FW880P				FW880W				FW880 *
	/21 /21M	/22	/33	/34	/21 /21M	/22	/33	/34	/02
Aux Input	x	x	x	x	x	x		x	x
Line Output	x	x	x	x	x	x		x	x
Subwoofer Output	x	x	x	x	x	x		x	x
Surround Output	x	x	x	x	x	x		x	x
Digital Output	x	x	x	x	x	x		x	x
Dolby B	x	x	x	x	x	x		x	x
RDS		x		x		x		x	x
CD Text	x	x	x	x	x	x		x	x
Karaoke Feature	x		x		x				
Tuner board - ECO5 Sys	x		x	x	x			x	
Tuner board - Tuner 95		x				x			x
Wireless Surround Set FB207/01					x				
Wireless Surround Set FB207/14								x	
Wireless Surround Set FB209/00						x			

* Standard Center Unit for /22 with separate Loudspeakers package.

SPECIFICATIONS

GENERAL:

Mains voltage : 100V for /26
110-127V/220-240V Switchable for /21
120V for /37
220V for /33
220-230V for /22/34
230V for /25
230-240V for /30
Mains frequency : 50/60Hz
Power consumption : < 2W on Display off mode /22
< 18W on Standby mode
< 175W at 1/8 rated power out
Clock accuracy : < 4 seconds per day
Dimension centre unit : 265 x 310 x 365mm

TUNER:

FM

Tuning range : 87.5-108MHz
65.81-74MHz for /34
Grid : 50kHz/100kHz for /21
30kHz for /34
IF frequency : 10.7MHz ± 25kHz
Aerial input : 75ohm coaxial
300ohm click fit for /37
Sensitivity at 26dB S/N : < 7μV
Selectivity at 600kHz bandwidth : > 50dB
Image rejection : > 25dB [> 75dB]
Distortion at RF=1mV, dev. 75kHz : < 3% [< 2%]
-3dB Limiting point : < 7μV
Crosstalk at RF=1mV, dev. 40kHz : > 18dB [> 26dB]

MW

Tuning range : 531-1602kHz
530-1700kHz for /21/37
Grid : 9kHz
10kHz for /21/37
IF frequency : 450kHz ± 1kHz
Aerial input : Frame aerial
Sensitivity at 26dB S/N : < 4.0mV/M
Selectivity at 18kHz bandwidth : > 18dB
IF rejection : > 45dB
Image rejection : > 28dB
Distortion at RF=50mV, m=80% : < 5% [< 7%]

LW

Tuning range : 153-279kHz
Grid : 3kHz
IF frequency : 450kHz ± 1kHz
Aerial input : Frame aerial
Sensitivity at 26dB S/N : [< 7.0mV/M]
Selectivity at 18kHz bandwidth : [> 24dB]
IF rejection : [> 26dB]
Image rejection : [> 35dB]
Distortion at RF=50mV, m=80% : [< 7%]

AMPLIFIER:

Output power at 1kHz, THD10%(RMS):
L & R : 2 x 130W ± 1dB at 6 ohm
Center : 40W ± 1dB at 12 ohm
Surround : 40W ± 1dB at 2 x 6 ohm
Frequency response within -3dB : 40Hz-18kHz
Dynamic Bass Boost 1) : BEAT
: PUNCH
: BLAST
: DBB Off
Digital Sound Control1) : Optimal, Rock, Classic, Techno or PERSONAL
Incredible Surround 1) : IS ON, IS Off
Input sensitivity
Aux/Line-in : 350mV ± 2dB at 47 kohm
Mic : 2.5mV ± 2dB at 600 ohm
Output sensitivity
Line-out : 500mV ± 2dB at 22 kohm
Sub-woofer (max. vol.) : 1.4V ± 2dB at 22 kohm
Surround-out : 500mV ± 2dB at 22 kohm
Digital-out : 44.1kHz
Headphone : 15mW at 32 ohm

CASSETTE RECORDER:

Number of track : 2 x 2 stereo
Tape speed : 4.76 cm/sec ± 2%
1.6 x 4.76 cm/sec
Wow and flutter : < 0.6% DIN
Fast-wind/Rewind time C60 : 130 sec
Bias system : 75kHz ± 10kHz
Rec/Pb frequency response within 5dB : 80Hz - 12.5kHz
Signal to noise ratio (IEC I) : > 44dB
Signal to noise ratio (IEC II) : > 47dB
Dolby NR Factor : > 8.5dB

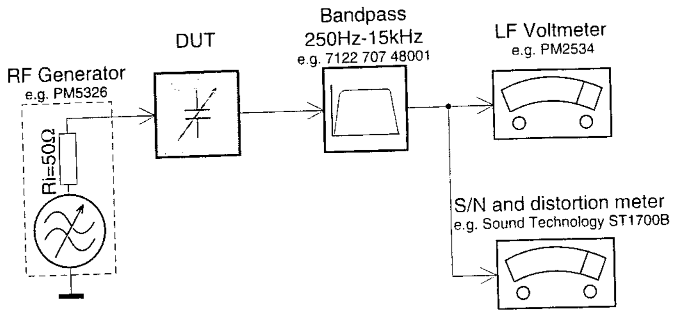
COMPACT DISC:

Measurement done at output conn. of the CDC module.
Frequency response within ± 3dB : 20Hz - 20kHz
Output level (in Vrms) : 550mV ± 2dB unloaded
Signal/Noise ratio (A-weighted) : > 80dBA
Distortion at 1kHz : < 0.5%
Channel difference at 1kHz : < 1dB
Channel crosstalk at 1kHz : > 45dB
De-emphasis : 0 or 15/50 mS (Switched by subcode on the disc)

[....] Values indicated are for "Tuner 95 Board" only
1) Frequency response in each setting is software controlled.

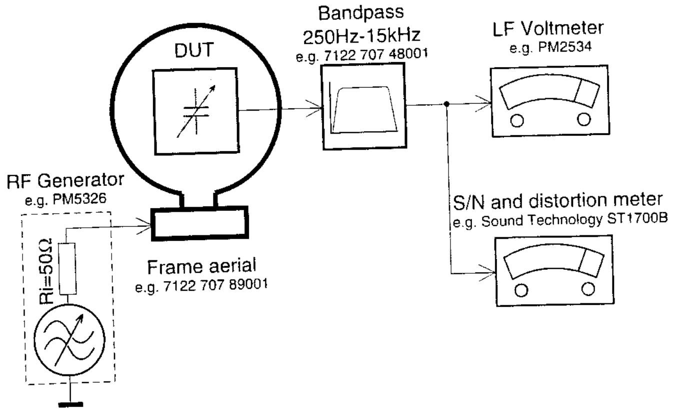
MEASUREMENT SETUP

Tuner FM


DUT
Bandpass
250Hz-15kHz
e.g. 7122 707 48001
LF Voltmeter
e.g. PM2534
RF Generator
e.g. PM5326
Ri=50Ω
S/N and distortion meter
e.g. Sound Technology ST1700B

Use a bandpass filter to eliminate hum (50Hz, 100Hz) and disturbance from the pilottone (19kHz, 38kHz).

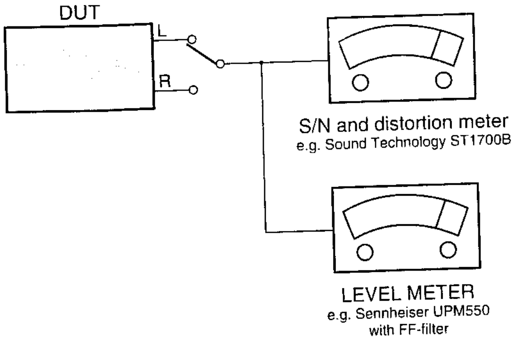
Tuner AM (MW,LW)


DUT
Bandpass
250Hz-15kHz
e.g. 7122 707 48001
LF Voltmeter
e.g. PM2534
RF Generator
e.g. PM5326
Ri=50Ω
Frame aerial
e.g. 7122 707 89001
S/N and distortion meter
e.g. Sound Technology ST1700B

To avoid atmospheric interference all AM-measurements have to be carried out in a Faraday´s cage.
Use a bandpass filter (or at least a high pass filter with 250Hz) to eliminate hum (50Hz, 100Hz).

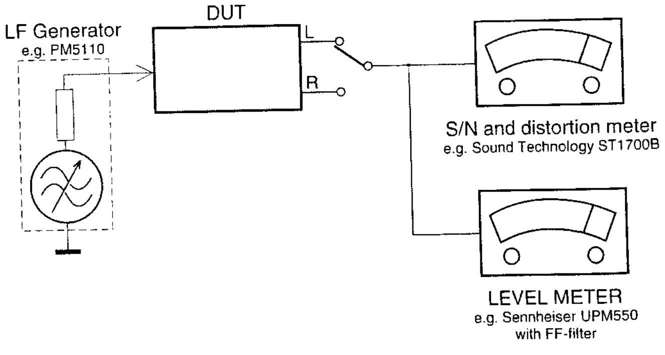
CD

Use Audio Signal Disc SBC429 4822 397 30184
(replaces test disc 3)


DUT
L
R
S/N and distortion meter
e.g. Sound Technology ST1700B
LEVEL METER
e.g. Sennheiser UPM550
with FF-filter

Recorder

Use Universal Test Cassette **CrO2** SBC419 4822 397 30069
or Universal Test Cassette **Fe** SBC420 4822 397 30071


DUT
LF Generator
e.g. PM5110
L
R
S/N and distortion meter
e.g. Sound Technology ST1700B
LEVEL METER
e.g. Sennheiser UPM550
with FF-filter

SERVICE AIDS

Service Tools:

Universal Torx driver holder	4822 395 91019
Torx bit T10 150mm	4822 395 50456
Torx driver set T6 - T20	4822 395 50145
Torx driver T10 extended	4822 395 50423

Cassette:

SBC419 Test cassette CrO2	4822 397 30069
SBC420 Test cassette Fe	4822 397 30071
MTT150 Dolby level 200nWb/M	4822 397 30271

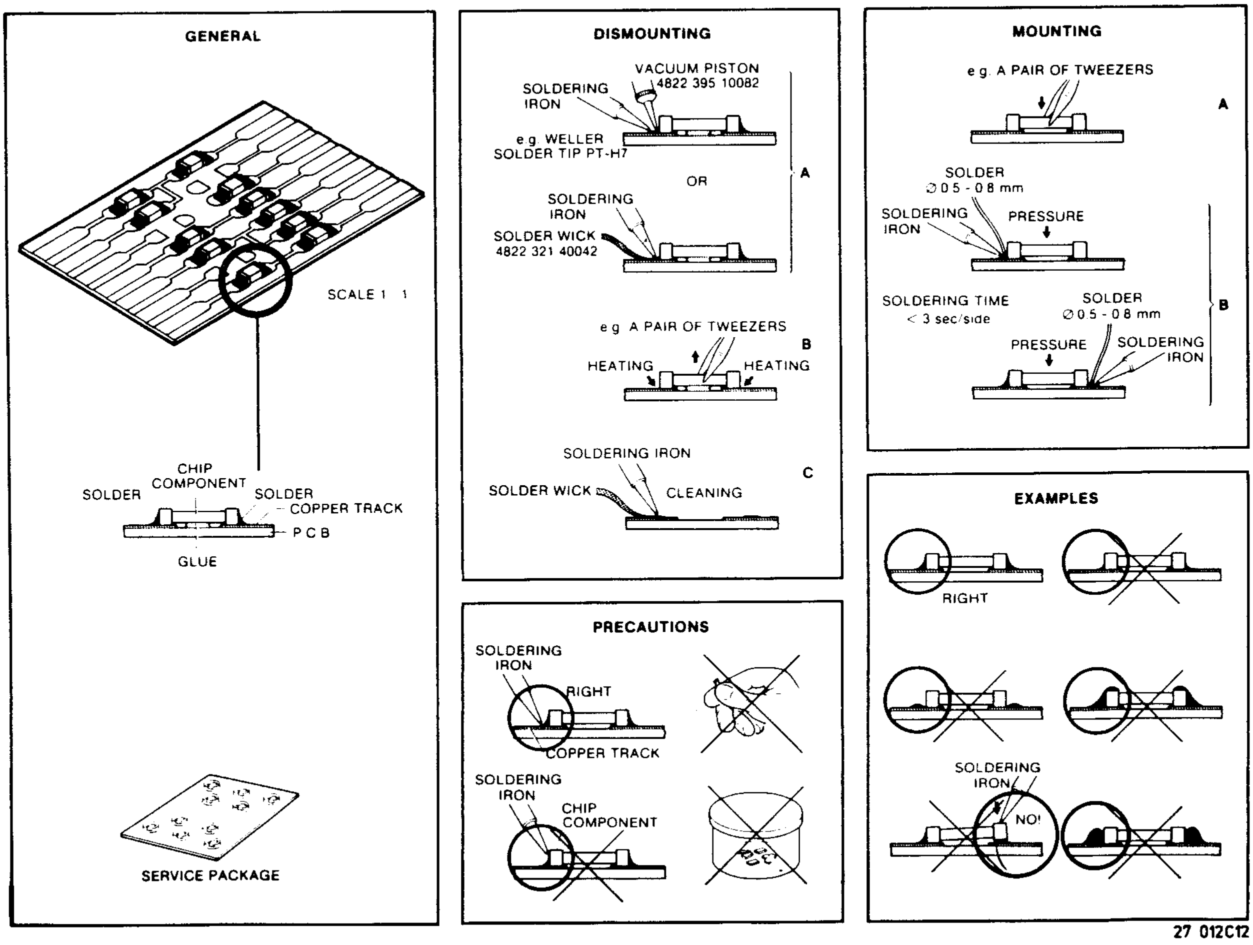
Compact Disc:

SBC426/426A Test disc 5 + 5A	4822 397 30096
SBC442 Audio Burn-in Test disc 1kHz	4822 397 30155
SBC429 Audio Signals disc	4822 397 30184
Dolby Pro-logic Test Disc	4822 395 10216

ESD Equipment:

Anti-static table mat - large 1200x650x1.25mm	4822 466 10953
Anti-static table mat - small 600x650x1.25mm	4822 466 10958
Anti-static wristband	4822 395 10223
Connector box (1MΩ)	4822 320 11307
Extension cable (to connect wristband to conn. box)	4822 320 11305
Connecting cable (to connect table mat to conn. box)	4822 320 11306
Earth cable (to connect product to mat or box)	4822 320 11308
Complete kit ESD3 (combining all above products)	4822 320 10671
Wristband tester	4822 344 13999

HANDLING CHIP COMPONENTS


GENERAL
SCALE 1 : 1
CHIP COMPONENT
SOLDER
SOLDER
COPPER TRACK
PCB
GLUE
SERVICE PACKAGE
DISMOUNTING
VACUUM PISTON 4822 395 10082
SOLDERING IRON
e.g. WELLER SOLDER TIP PT-H7
OR
A
SOLDERING IRON
SOLDER WICK 4822 321 40042
e.g. A PAIR OF TWEEZERS
B
HEATING
HEATING
SOLDERING IRON
C
SOLDER WICK
CLEANING
PRECAUTIONS
SOLDERING IRON
RIGHT
COPPER TRACK
SOLDERING IRON
CHIP COMPONENT
MOUNTING
e.g. A PAIR OF TWEEZERS
A
SOLDER
∅ 0.5 - 0.8 mm
SOLDERING IRON
PRESSURE
SOLDERING TIME
< 3 sec/side
SOLDER
∅ 0.5 - 0.8 mm
B
PRESSURE
SOLDERING IRON
EXAMPLES
RIGHT
SOLDERING IRON
NO!

27 012C12

(GB) **WARNING**

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD).
Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance.
Keep components and tools also at this potential.

ESD

(NL) **WAARSCHUWING**

Alle IC's en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen.
Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

(F) **ATTENTION**

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).
Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.
Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

(D) **WARNUNG**

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kan die Lebensdauer drastisch reduzieren.
Veranlassen Sie, dass Sie im Reparaturfall über ein Pulsarmband mit Widerstand verbunden sind mit dem gleichen Potential wie die Masse des Gerätes.
Bauteile und Hilfsmittel auch auf dieses gleiche Potential halten.

(I) **AVVERTIMENTO**

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione.
Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

(GB)

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified, be used.

(NL)

Veiligheidsbepalingen vereisen, dat het apparaat bij reparatie in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.

(F)

Les normes de sécurité exigent que l'appareil soit remis à l'état d'origine et que soient utiliséés les piéces de rechange identiques à celles spécifiées.

(D)

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Original zustand des Geräts darf nicht verändert werden; für Reparaturen sind Original-Ersatzteile zu verwenden.

(I)

Le norme di sicurezza esigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambio identici a quelli specificati.

"After servicing and before returning set to customer perform a leakage current measurement test from all exposed metal parts to earth ground to assure no shock hazard exist. The leakage current must not exceed 0.5mA."

"Pour votre sécurité, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".

CLASS 1
LASER PRODUCT
3122 110 03420

(GB) **Warning !**

Invisible laser radiation when open.
Avoid direct exposure to beam.

(S) **Varning !**

Osynlig laserstrålning när apparaten är öppnad och spärren är urkopplad. Betrakta ej strålen.

(SF) **Varoitus !**

Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle laserisäteilylle. Älä katso säteeseen!

(DK) **Advarse !**

Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsaettelse for stråling.

GENERAL INFORMATION

SAFETY INFORMATION

General Information

- ***The type plate (which contains the serial number) is located at the rear of the system.***
- ***Recording is permissible if copyright or other rights of third parties are not infringed.***

Environmental Information

All unnecessary packaging material has been omitted. We have done our utmost to make the packaging easily separable into three mono-materials: cardboard (box), polystyrene foam (buffer) and polythene (bags, protective foam sheet).

Your system consists of materials which can be recycled and reused if disassembled by a specialized company. Please observe the local regulations regarding the disposal of packaging materials, exhausted batteries and old equipment.

Acknowledgement

DOLBY SURROUND
PRO • LOGIC

DOLBY B NR

Dolby Pro-Logic, the Dolby B NR System and the double-D symbol DD are trademarks of Dolby Laboratories Licensing Corporation.
Manufactured under license from Dolby Laboratories Licensing Corporation.

Accessories *(Supplied)*

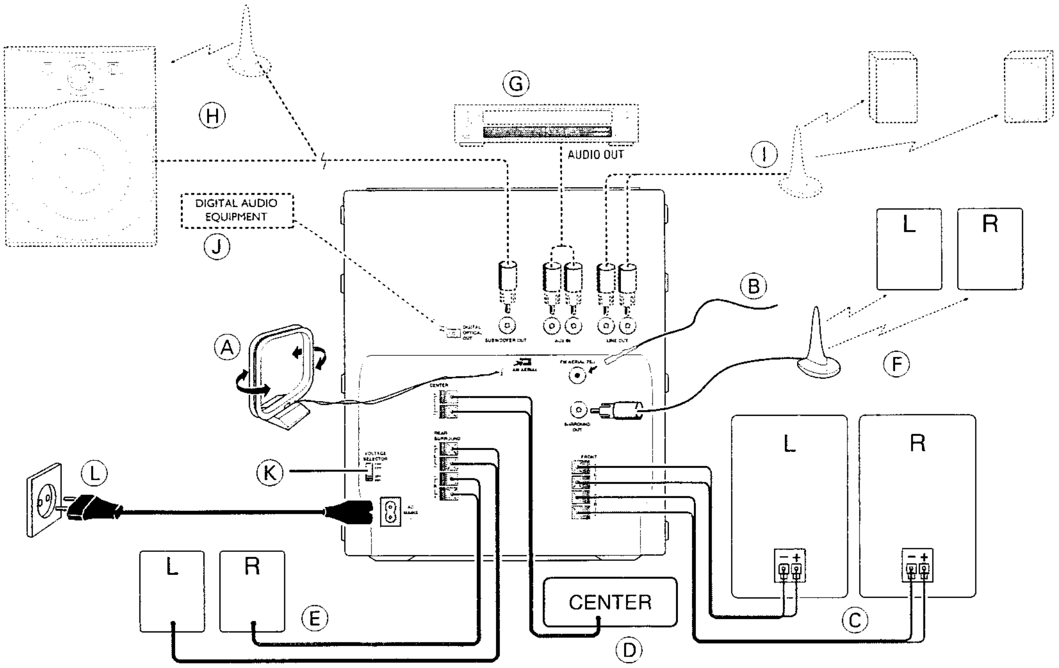
- Remote control
- Batteries (2 x AA size) for remote control
- AM loop antenna
- FM antenna wire
- AC power cord
- Philips FB 5CS Surround package (includes 2 x surround rear speakers and 1 x center speaker) for model FW880P only.
- Model FB 207W wireless surround speaker package (includes 1 x wireless active surround rear speaker, 1 x wireless passive surround rear speaker and 1 x center speaker and a transmitter unit) for model FW880W only.

Safety Information

- Before operating the system, check that the operating voltage indicated on the type plate (or the voltage indication beside the voltage selector) of your system is identical with the voltage of your local power supply. If not, please consult your dealer. The type plate is located at the rear of your system.
- When the system is switched on, do not move it around.
- Place the system on a solid base (e.g. a cabinet).
- Place the system in a location with adequate ventilation to prevent internal heat build-up in your system.
- The system incorporates a built-in safety feature that prevents overheating.
- Do not expose the system to excessive moisture, rain, sand or heat sources.
- Under no circumstances should you repair the unit yourself, as this will invalidate the warranty!
- If the system is brought directly from a cold to a warm location, or is placed in a very damp room, moisture may condense on the lens of the CD unit inside the system. Should this occur, the CD player will not operate normally. Leave the power on for about one hour with no disc in the unit until normal playback is possible.
- Electrostatic discharge may cause unexpected problems. See whether these problems disappear if you unplug the AC power cord and plug it in again after a few seconds.
- **To disconnect the system from the power supply completely, remove the AC power plug from the wall socket.**

PREPARATION

Rear Connections



Ⓐ AM Antenna Connection

Connect the supplied loop antenna to the AM AERIAL terminal. Place the AM loop antenna far away from the system and adjust its position for the best reception.

Ⓑ FM Wire Antenna Connection

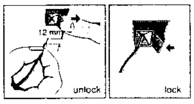
Connect the supplied FM wire antenna to the FM 75 Ω terminal. Adjust the position of the FM antenna for the best reception.

Outdoor Antenna

For better FM stereo reception connect an outdoor FM antenna to the FM AERIAL 75 Ω terminal using a 75 Ω coaxial wire.

Ⓒ Speaker Connections

- Connect the right speaker to Front terminal R, with the red wire to + and the black wire to – .
- Connect the left speaker to Front terminal L, with the red wire to + and the black wire to – .
- Clip the stripped portion of the speaker wire as shown.



For Dolby Pro Logic Connection, see page 8.

Ⓓ Center Speaker Connection

Connect the black or non-marked wires to the black CENTER terminal and the blue or marked wires to the blue CENTER terminal.

Ⓔ Rear Speakers' Connection

(For model FW880P only)

Connect the black or non-marked wires to the black REAR terminals and the white or marked wires to the grey REAR terminals.

Ⓕ Wireless Surround Out Connection

(For model FW880W only)

You may connect transmitter unit of the wireless rear speakers (Model FB 207W is supplied with FW880W) to the SURROUND OUT terminal instead of the wired rear speakers. Be sure to follow the instructions supplied with the wireless rear speakers.

Note:

– Availability of wireless transmitter and its peripherals are subjected to the approval of local authorities. Please check with respective local safety or approving authority.

Ⓖ Connecting other equipment to your system

You can connect the audio left and right OUT terminals of a TV, VCR, Laser Disc or DVD player to the AUX IN terminals at the rear of the system.

Ⓗ Subwoofer Out Connection

You can connect either an optional active subwoofer or an optional wireless active subwoofer to the SUBWOOFER OUT terminal. The wireless system uses a radio frequency transmitter. The subwoofer reproduces just the low bass effect (e.g. explosions, the rumble of the spaceships, etc.). Be sure to follow the instructions supplied with the subwoofer unit.

Ⓘ Line Out *(wireless ready)*

You may install additional front active speakers away from the system (e.g. in another room) to reduce the inconvenience of running long speaker wires across rooms. You can place as many remote speakers as you like provided that they operate at the same radio frequency. Connect the wireless radio frequency transmitter to the LINE OUT terminals. Place the active speakers at your preferred location. Be sure to follow the instructions supplied with the active speakers.

Ⓙ Digital Optical Out

You can record the digital sound from the CD, through this output, on any audio equipment with digital input (e.g. digital amplifier, Digital Audio Tape (DAT) deck, Digital to Analog Converter and Digital Signal Processor). Connect one end of the optical cable (not supplied) to the DIGITAL OPTICAL OUT socket and the other end to the audio equipment with digital input. When the DIGITAL OPTICAL OUT socket is not used, be sure to cover the socket with the supplied dust cap.

Ⓚ Adjusting the Operating Voltage

(not available for version /30)

Before connecting the AC power cord to the wall outlet, make sure that the voltage selector at the rear of the system is set to the local power line voltage. If not, reset the selector before connecting to the wall outlet.

Ⓛ AC Power Supply

After all other connections have been made, connect the AC power cord to the system and to the wall outlet.

Dolby Pro Logic

This state of the art Dolby Pro Logic mini system enables you to experience and enjoy a Home Cinema sound ambience. The Pro Logic system allows more accurate definition of the individual sound sources. It produces greater sound separation between channels and provides pinpoint sound localisation. Pro Logic provides four outputs which are called Left, Center, Right and Surround (Rear). Front signals are produced from the pair of Left and Right speakers and a Center speaker. The surround signal is reproduced by two speakers placed at the rear of the listening area. Although the surround signal is mono, a pair of speakers is necessary to produce the correct diffused sound field.

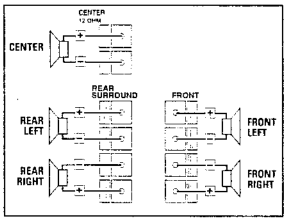
This Pro Logic decoder enables you to decode the following mode : ***Dolby Surround, Center Phantom, Dolby 3 Stereo*** or normal ***Stereo***.

Setting up the Dolby Pro Logic system

You need to do a proper set up in order for you to enjoy the Home Cinema sound to the fullest. First you need to do a complete speakers' connection.

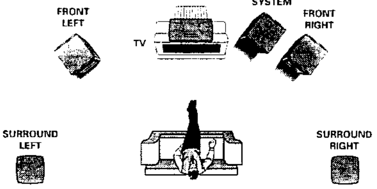
5-Speakers Connection

- ***Front speakers :*** Connect the black wires to the black FRONT terminals and the red wires to the red FRONT terminals.
- ***Center speaker :*** Connect the black or non-marked wires to the black CENTER terminal and the blue or marked wires to the blue CENTER terminal.
- ***Rear (surround) speakers :*** Connect the black or non-marked wires to the black REAR terminals and the white or marked wires to the grey REAR terminals. *You may also connect a pair of wireless rear speakers (not supplied for model FW880P) from the SURROUND OUT terminals.*



Positioning the Speakers

To get the best surround sound effect, place the speakers as follow.



Front Left and Right Speakers

For best listening effect, it is recommended to have the Left and Right speakers to form an angle of approximately 45 degrees to the listener. The speakers are magnetic shielded. Should the magnetic field from the speakers affect the picture of the television, you should increase the separation distance.

Center Speaker

For best directional effect, try to have the center speaker at the same height as the left and right speakers and as close as possible to the screen. Place it directly above or beneath the television set.

Rear (surround) Speakers

The surround speaker should be placed at normal listening ear level. It can also be mounted on the wall at the back of the room. Most important , sometimes you need to experiment creatively when placing the surround speakers in order to obtain the most ideal sound projection.

Test Tone

This feature enables you to adjust the Front Left, Front Right, Center and Surround sound level of the respective speakers in Dolby Pro Logic mode.

You must sit at the ideal sitting position and use the remote control to perform this operation.

1 Press **CD**, **TUNER**, **TAPE** or **AUX•DVD** to switch on the system.

2 Press **TEST TONE**.
→ A test signal is generated and it will move through the Left, Center, Right and Surround speakers respectively.
→ "TEST TONE" followed by " ADAPT BALANCE, CENTER AND REAR LEVEL" will be displayed.
→ The test signal will last for about 90 seconds.

3 Press the **BALANCE L** to adjust the desired sound level of front left speaker.
→ The display will show BAL L+XX.

4 Press the **BALANCE R** to adjust the desired sound level of front right speaker.
→ The display will show BAL R +XX.

5 Press the **CENTER** + or − to adjust the sound level of center speaker.
→ The display will show either CENT +XX or -XX.

6 Press the **REAR** + or − to adjust the desired sound level of surround speaker.
→ The display will show either REAR +XX or -XX.

7 Adjust the sound level of all the speakers until they are of the same apparent loudness. When you are satisfied with the setting, press **TEST TONE** again to switch off the test signal.

Note:
– *It is advisable to set the speakers' level at normal listening level. "XX" denotes the sound level.*

When you have completed the Dolby Pro Logic setup, you are ready to experience and enjoy a Home Cinema sound ambience.

- Press **DOLBY PRO LOGIC (DPL)** repeatedly to select and cycle through the various sound mode.

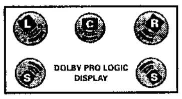
Dolby Surround → Center Phantom → Dolby 3 Stereo → Stereo → Dolby Surround ...

→ The Dolby Pro Logic Control display panel will light up with the respective selection.

Dolby Surround

This setting is for a full Dolby Surround Pro Logic mode.

- Press **DOLBY PRO LOGIC** to select the Dolby Surround mode.
→ The display message "DOLBY SURROUND" will be displayed.
→ The DPL Control display panel will light up.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DOLBY PRO LOGIC DISPLAY
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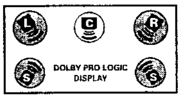
Dolby Center Phantom

This setting is for use without the center speaker. It redistributes the center channel information to the left and right speakers providing conventional stereo across the front.

- Press **DOLBY PRO LOGIC** to select the Dolby Pro Logic Center Phantom mode.
→ The display message "CENTER PHANTOM" will be displayed.
→ The DPL Control display panel will light up.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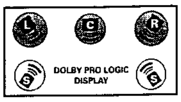
Dolby 3 Stereo

This setting is for use where full surround is not required, but a wide stereo sound is desirable. It only requires the left, right and center speakers.

- Press **DOLBY PRO LOGIC** to select the Dolby 3 Stereo mode.
→ The display message "DOLBY 3 STEREO" will be displayed.
→ The DPL display panel will light up.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DOLBY PRO LOGIC DISPLAY
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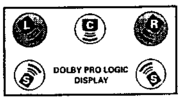
Normal Stereo

This setting is for normal stereo sound without Dolby Pro Logic. It only requires the left and right speakers.

- Press **DOLBY PRO LOGIC** to select the Stereo mode.
→ The display message "STEREO" will be displayed.
→ The DPL display panel will light up.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DOLBY PRO LOGIC DISPLAY
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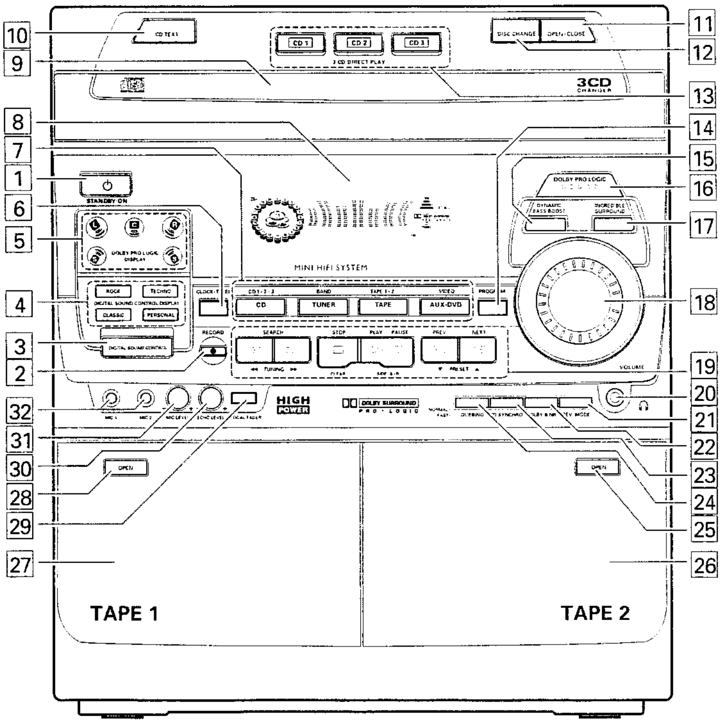
Important!

1. To listen to the optimum Dolby Pro Logic sound effect, it is recommended to switch on DPL in combination with "Classic" and without Incredible Surround.
2. Dolby Pro Logic mode will automatically switch to normal Stereo mode when Vocal Fader is activated or when a headphones is connected.
3. It is recommended to switch to normal stereo mode when you do recording on a tape.

CONTROLS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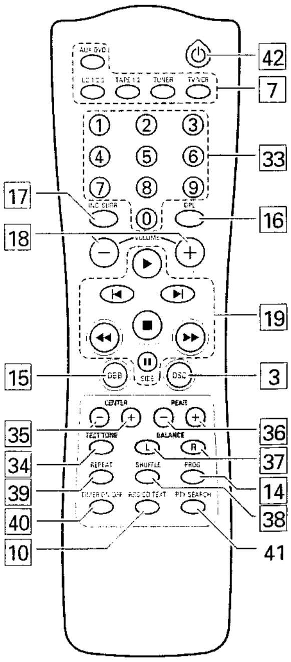
CD TEXT
CD 1
CD 2
CD 3
3 CD DIRECT PLAY
DISC CHANGE
OPEN•CLOSE
3CD CHANGER
STANDBY ON
DOLBY PRO LOGIC
MINI HIFI SYSTEM
CD
TUNER
TAPE
AUX-DVD
RECORD
SEARCH
STOP
PLAY
PAUSE
PREV
NEXT
TUNING
PRESET
VOLUME
HIGH POWER
DOLBY SURROUND PRO LOGIC
OPEN
OPEN
TAPE 1
TAPE 2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TAPE 1 2
TUNER
TV/VCR
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DPL
VOLUME
CENTER
REAR
TEST TONE
BALANCE
L
R
REPEAT
SHUFFLE
PROG

Controls on the system and remote control

1 **STANDBY-ON**
- to switch the system on or to standby mode.

2 **RECORD**
- to start recording on tape deck 2

3 **DIGITAL SOUND CONTROL (DSC)**
- to select the desired sound effect : OPTIMAL, CLASSIC, ROCK, TECHNO, PERSONAL 1, PERSONAL 2 or PERSONAL 3.

4 **DIGITAL SOUND CONTROL DISPLAY PANEL**
- to view the selected DSC setting.

5 **DOLBY PRO LOGIC CONTROL DISPLAY PANEL**
- to view the selected Dolby Pro Logic setting.

6 **CLOCK•TIMER**
- to view clock, set clock or timer.

7 **SOURCE** : to select the following.

CD / (CD 1•2•3)
- to select CD mode. When CDin stop mode; to select the disc tray 1, 2 or 3.

TUNER / (BAND)
- to select Tuner mode. When in tuner mode; to select the waveband FM or MW.

TAPE / (TAPE 1•2)
- to select Tape mode. When tape in stop mode; to select either tape deck 1 or 2.

AUX•DVD / (VIDEO)
- to select external source (e.g. DVD, TV, Laser Disc or VCR sound).

TV/VCR *(only on the remote control)*
- to select TV/VCR mode.

8 **DISPLAY**
- to view the current setting of the system.

9 **CD CAROUSEL TRAY**

10 **CD TEXT**
- to view the CD encoded information.

11 **OPEN•CLOSE**
- to open or close the CD carousel tray.

12 **DISC CHANGE**
- to change CD(s).

13 **3 CD DIRECT PLAY**
- to select a CD tray for playback.

14 **PROGRAM**
- to program CD track in CD mode or preset radio stations in tuner mode.

15 **DYNAMIC BASS BOOST (DBB)**
- to switch on bass boost to enhance bass response or to switch off bass boost

16 **DOLBY PRO LOGIC (DPL)**
- to select Dolby Surround, Dolby Center Phantom, Dolby 3 Stereo or Stereo mode.

17 **INCREDIBLE SURROUND**
- to switch on or off the surround sound effect.

18 **VOLUME**
- to adjust the volume level.

19 **MODE SELECTION**

SEARCH ◀◀ ▶▶ (TUNING ◀◀ ▶▶)

for CD .... to search backward/forward.
for TUNER ..... to tune to a lower or higher radio frequency.
for TAPE .... to rewind or fast forward the tape.

STOP ■ (CLEAR)

for CD .... to stop CD playback or clear a program.
for TUNER ..... to stop programming.
for TAPE .... to stop playback or recording.

PLAY PAUSE ▶ ❚❚ (SIDE A•B)

for CD .... to start or interrupt playback.
for TAPE .... to start playback. When playing in tape 2 mode; to change side.

PREV ◀◀ / NEXT ▶▶ (PRESET ▲ ▼)

for CD .... to skip to the beginning of the current or previous/next track.
for TUNER ..... to select a preset radio station in memory.

20 🎧
- to connect headphones jack.

21 **REVERSE MODE**
- to select the different play mode on tape deck 2 only.

22 **DOLBY B NR**
- to switch on or off the Dolby B NR mode.

23 **CD SYNCHRO**
- to synchronise the CD recording on a tape.

24 **DUBBING**
- to dub a tape in normal or high speed mode.

25 **OPEN**
- to open tape deck 2.

26 **TAPE DECK 2**

27 **TAPE DECK 1**

28 **OPEN**
- to open tape deck 1.

29 **VOCAL FADER** *(not available for version /30)*
- to fade out the vocal of the original song

30 **ECHO LEVEL** *(not available for version /30)*
- to adjust the echo level for karaoke or microphone recording.

31 **MIC LEVEL** *(not available for version /30)*
- to adjust the mixing level for karaoke or microphone recording.

32 **MIC 1 and 2** *(not available for version /30)*
- to connect microphones jack.

33 **DIGIT 0 - 9**
- (numbers consisting of two figures must be keyed in within 2 seconds.)
- to key in a CD track, preset radio station or a TV channel.

34 **TEST TONE**
- to check the sound level for Front Left, Front Right, Center and Surround speakers respectively.

35 **CENTER +/–**
- to adjust the sound level of the center speaker.

36 **REAR +/–**
- to adjust the sound level of the surround speakers.

37 **BALANCE L/R**
- to balance the sound level of the Front Left and Right speakers.

o **SHUFFLE**
- to play all the available discs and their tracks in random order.

39 **REPEAT**
- to repeat a CD track.

40 **TIMER ON/OFF**
- to switch on or off timer.

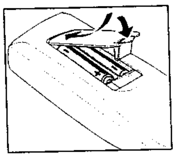
41 **PTY SEARCH** – *not functional for this model.*

42 ⏻
- to switch the system to standby mode.

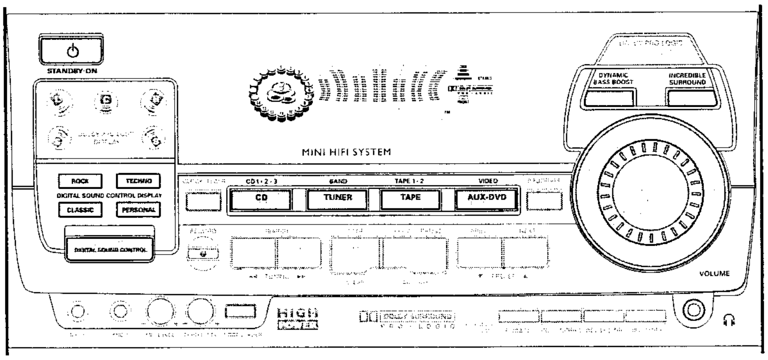
Notes for remote control:
- *First select the source you wish to control by pressing one of the source select keys on the remote control (e.g. CD, TUNER, TAPE 1/2, AUX/DVD or TV/VCR).*
- *Then select the desired function (PLAY, NEXT, etc.).*

Inserting batteries into the Remote Control

- Insert the batteries (Type R06, UM3 or AA) into the remote control as shown in the battery compartment.



- To avoid damage from possible battery leakage, remove dead batteries or batteries that will not be used for a long time. For replacement, use type R06, UM3 or AA batteries.



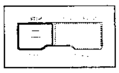
Important:
Before you begin operating the system, complete the preparation procedures.

Demonstration mode

The system has a demonstration mode that shows the various features offered by the system. ***Whenever the system is switched on from the wall socket, the demonstration mode will start automatically.***

Notes:
- *During demonstration mode, if you press any source (or standby-on) button, the system will switch to the respective (or standby) mode.*
- *When the system is switched to standby mode, 5 seconds later, the demonstration mode will begin again.*

To cancel demonstration mode



- Press and hold **STOP ■** *(on the system only)* for ***3 seconds*** to stop the demonstration.
  → The demonstration mode will be switched off permanently.
  → The system will switch to standby mode.

Switching the system ON

- Press **STANDBY•ON** *(on the system only)*, **CD**, **TUNER**, **TAPE** or **AUX•DVD**.

You can also switch on the system by pressing any one of the 3 CD DIRECT PLAY buttons.

Switching the system to standby mode

- Press **STANDBY•ON** again.
  → The system will switch to standby mode.

Selecting the Source

- Press the respective source selection button: **CD**, **TUNER**, **TAPE** or **AUX•DVD**.
  → The display indicates the selected source.

Note:
- *For an external source, make sure that you have connected the audio left and right OUT terminals of the external equipment (TV, VCR, Laser Disc or DVD player) to the AUX IN terminals.*

Sound Control

Volume Adjustment
Rotate **VOLUME** right or left to increase or decrease the sound level.

For Personal Listening
Connect the headphones plug to the 🎧 socket at the front of the system. The speakers will be muted and DPL mode will be switched off.

Incredible Surround
Normal stereo sound is determined by the distance between the front speakers. When Incredible Surround is switched on, it magnifies the virtual distance between the front speakers for an incredibly wide, enveloping stereo effect.

- Press **INCREDIBLE SURROUND** to switch on.
  → The INCREDIBLE SURROUND button lights up.
  → "INCREDIBLE SURROUND" will be displayed.

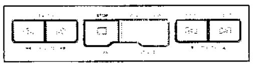
To switch off Incredible Surround
- Press **INCREDIBLE SURROUND** again.
  → The INCREDIBLE SURROUND button light is switched off.
  →"IS OFF" will be displayed.

Digital Sound Control (DSC)
The DSC feature enables you to enjoy special sound effects that have preset equalizer settings, providing the best music reproduction.

- Press **DIGITAL SOUND CONTROL (DSC)** to select OPTIMAL, CLASSIC, ROCK, TECHNO or PERSONAL (1, 2, 3).
  → The Digital Sound Control display panel will light up respectively. At Optimal setting, the DSC display panel does not light up.
  → "OPTIMAL, CLASSIC, ROCK, TECHNO, PERSONAL 1, PERSONAL 2 or PERSONAL 3" will be displayed.

Personal Setting allows you to store up to 3 preferred settings for bass and treble.

To set personal setting



1 Select Personal 1, 2, or 3.
2 Press and hold **DSC** button for 3 seconds.
  → The personal setting mode is switched on.
  → "ADJUST BASS AND TREBLE" will be displayed.
3 Press ◀◀ or ▶▶ to adjust the bass.
  → "BASS -XX or +XX" will be displayed.
4 Press |◀ or ▶| to adjust the treble.
  → "TREBLE -XX or +XX" will be displayed.
5 Press **DSC** again to confirm.

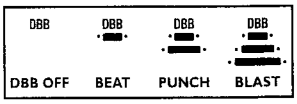
Note:
- *"XX" denotes the sound level.*

Automatic DSC-DBB selection
The best setting for the DBB is automatically generated for the respective DSC selection. You can also manually select the DBB setting that best suits your listening environment.

DSC Selection	DBB Selection
Optimal →	Punch
Classic →	Beat
Rock →	Blast
Techno →	Blast

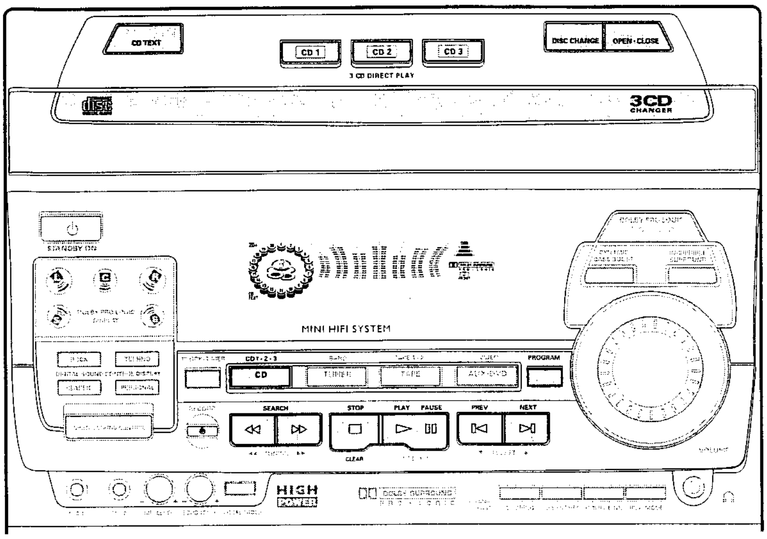
Dynamic Bass Boost (DBB)
There are 3 settings for the DBB mode to enhance the bass response.

- Press **DBB** briefly to select the various level of bass boost.
  → The DBB button lights up.
  → "BEAT, PUNCH or BLAST" will be displayed.



To switch off DBB
- Press **DBB** briefly until the DBB button light is switched off.
  →"DBB OFF" will be displayed.

Note:
- *Some CDs or tapes might be recorded in high modulation. It may cause a distortion at high volume. Should this occur, it is advisable to switch off Incredible Surround, select a lower DBB level or reduce the volume.*



Warning!

1. ***This system is designed for conventional CDs. Do not use any accessories like disc stabilizer rings or CD treatment sheets, etc., which may damage the CD mechanism.***
2. ***Do not load more than one disc into each tray.***
3. ***When the CD changer is loaded with CD(s), do not turn over or shake the system. This may jam the changer mechanism.***

You can load up to three discs in the CD changer for continuous playback without interruption.

Loading the CD Changer

1 Press **CD** to select CD mode.
2 Press **OPEN•CLOSE**.
  → The CD compartment slides out.
3 Load a CD with the printed side up in the right tray.
- You can load another disc in the left tray.
- To load the third disc, press the **DISC CHANGE** button.
  → The CD changer carousel will rotate until the empty tray is at the right hand side and is ready for loading.
  → Playback will always start with the disc in the outer right disc tray.
4 Press **OPEN•CLOSE** to close the CD compartment.
  → The total number of tracks and playing time of the last selected disc appear on the display.

CD Text

It will enable you to know which album and its track you are selecting or playing on specially encoded CD.

- Press **CD TEXT**.
  At stop mode
  → The title of album or total playing time will be displayed.
  During Playback
  → The title of album, track title or elapsed time will be displayed.
- If the album and track title are not known.
  → "NO TEXT ON DISC" will be displayed.

3 CD Direct Play

You can play a CD directly by pressing the **3 CD DIRECT PLAY (1 - 3)** buttons. The CD player will stop at the end of playback of the selected disc.

- When the button is green, it indicates that there is no disc loaded in the disc tray.
- When the button is red, it indicates that there is a disc loaded in the disc tray.

Playing a CD

1 Press **PLAY ▶** to start playback.
  → The disc tray, track number and elapsed playing time of the current track appear on the display.
  → The current track number will also be flashing on the circular music calendar.
  → When a track has been played, the track number will be erased from the circular music calendar.
- To interrupt playback, press **PAUSE II**.
  → The playing time flashes.
- To resume playback, press **PLAY ▶** again.
2 To stop playback, press **STOP ■**.

Note:
- *All the available discs will be played once, then stop. When the CD has stopped playing, the system will switch to the standby mode after 15 minutes if no button is pressed.*

Disc Change

You can change the outer 2 discs while the third inner disc is at the stop or playing mode.

1 Press **DISC CHANGE**.
  → The CD compartment slides out.
2 Replace the discs in the left and right disc trays.
- If you press **DISC CHANGE** again during playback, the CD will stop playing.
  → The CD carousel will rotate until the inner tray is at the right hand side and is ready for changing.
3 Press **OPEN•CLOSE** to close the CD compartment.

Selecting a desired track

Selecting a desired track at the stop mode

1 Press **PREV I◀** or **NEXT ▶I** until the desired track appears on the display.
2 Press **PLAY ▶** to start playback.
  → The selected track number and elapsed playing time appear on the display.

Selecting a desired track during playback

1 Press **PREV I◀** or **NEXT ▶I** until the desired track appears on the display.
  → The selected track number and elapsed playing time appear on the display.
- If you press **PREV I◀** once it will skip to the beginning of the current track and play the track again.

Note:
- *You can also key in the track number directly from the remote control.*

Searching for a particular passage during playback

- Press and hold ◀◀ or ▶▶ until the desired passage is located.
  → The volume will be reduced.
- Play returns to normal when ◀◀ or ▶▶ is released.

Programming Tracks

Programming tracks of a loaded CD is possible in the stop mode. The display will indicate the total tracks stored in the program. Up to 40 tracks can be stored in the memory in any order. When 40 tracks are stored and you attempt to store another track, the display will show "PROGRAM FULL".

1 Load the desired discs in the disc trays.
2 Press **PROGRAM** to start programming.
  → The PROGRAM flag starts flashing.
3 Press the **CD (CD 1•2•3)** button to select the disc.
4 Press **PREV I◀** or **NEXT ▶I** to select the desired track.
- You can also key in the track number directly from the remote control.
5 Press **PROGRAM** to store the track.
- Repeat steps ***3*** to ***5*** to store other discs and tracks.
6 Press **STOP ■** once to end programming mode.
  → The total number of tracks programmed and total playing time appear on the display.

CD

Notes:
- *If the total playing time is more than "99:59" or if one of the programmed tracks has a number greater than 30, then "- - : - -" appears in the display instead of the total playing time.*
- *During programming, if no button is pressed within 20 seconds, the system will exit program mode automatically.*

Playing the program

1 Press **PLAY** ▶ to start program playback.
  → "PLAY PROGRAM" appears on the display.
  → The track number and elapsed playing time of the current track will appear on the display.
- If you press **REPEAT** during program playback, the current track will be played repeatedly.
  → The REPEAT and PROGRAM flags will be displayed.

2 Press **STOP** ■ to stop program playback.

Note:
- *If you press any of the 3 CD DIRECT PLAY buttons, the system will play the selected disc or track and the stored program will be ignored temporarily. The PROGRAM flag will also temporary disappear from the display and then reappear, when the playback for the selected disc ends.*

Reviewing the program

Reviewing of the program is only possible in the stop mode.
- Press **PREV** ⏮ or **NEXT** ⏭ repeatedly to review the programmed tracks.
- Press **STOP** ■ to exit review mode.

Erasing the program *(in the stop mode)*

- Press **CLEAR** on the system.
  → "PROGRAM CLEARED" will be displayed.

Note:
- *The program is also erased when the system is disconnected from the power supply. If the CD carousel is opened, the tracks belonging to the outer two trays will be erased and the display will show "CLEARED".*

Shuffle *(only on remote control)*

It will play all the available discs and their tracks in random order. Shuffle can also be used when tracks are programmed.

To shuffle all the discs and tracks

1 Press **SHUFFLE**.
  → "SHUFFLE" will be displayed.
  → The SHUFFLE flag, the disc and the track selected at random appear on the display.
- The discs and the tracks will now be played in random order until you press **STOP** ■.
- If you press **REPEAT** during shuffling, the current track will be played repeatedly.
  → The REPEAT and SHUFFLE flags will be displayed.

2 Press **SHUFFLE** again to resume normal playback.
  → The SHUFFLE flag disappears from the display.

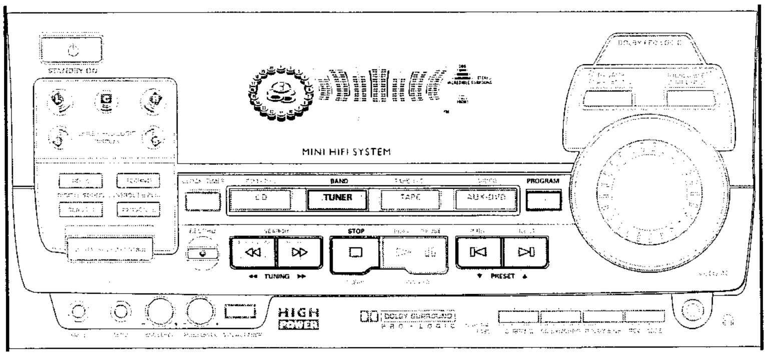
Repeat *(only on remote control)*

It will play the current track repeatedly.

1 Press **REPEAT** during playback.
  → "REPEAT TRACK" will be displayed.
  → The REPEAT flag and the track selected appear on the display.
- The track will be played repeatedly until you press **STOP** ■.

2 Press **REPEAT** again to resume normal playback.
  → The REPEAT flag disappears from the display.

TUNER



Tuning to radio stations

1 Press **TUNER** to select TUNER mode.
  → "TUNER" will be displayed.
  A few seconds later, the current frequency or the radio station name if available will be displayed.

2 Press **TUNER** (BAND) again to select the desired waveband : FM or MW.

3 Press **TUNING** ◀◀ or ▶▶ for more than one second, then release.
  → The display will show "SEARCH" until a station with sufficient signal strength is found.
- Repeat this procedure until the desired station is reached.
- To tune to a weak station, briefly press **TUNING** ◀◀ or ▶▶ until the display shows the desired frequency and/or when the best reception has been obtained.

Storing Preset Stations

You can store up to 40 stations in the memory. When a preset radio station is selected, the preset number appears next to the frequency on the display.

Automatic programming

1 Press **TUNER**.

2 Press **TUNER** (BAND) again to select the desired waveband : FM or MW.

3 Press **PROGRAM** for more than one second.
  → PROGRAM flag starts flashing and "AUTO" will be displayed.
  → Every available radio station for the selected waveband will be stored automatically. The frequency and preset number will be displayed briefly.
  → The system will stop searching when all the available radio stations are stored or when the memory for 40 preset radio stations is used.
  → The system will remain tuned to the last stored preset radio station.
- Repeat the above procedure to store other preset stations for the other waveband. Remember to select the next available preset number before proceeding. If not, some of the preset radio stations may be erased.

Notes:
- *You can cancel the automatic programming by pressing PROGRAM or STOP ■ (on the system only).*
- *If you want to reserve a section of preset numbers, for example preset numbers 1 to 9, select preset 10 before starting automatic programming: now only the preset numbers 10 to 40 will be programmed.*

Manual programming

1 Press **TUNER**.

2 Press **TUNER** (BAND) to select the desired waveband : FM or MW.

3 Press **PROGRAM** for less than one second.
  → The PROGRAM flag starts flashing.
  → The next available preset number will be displayed for selection.

4 Press **TUNING** ◀◀ or ▶▶ to tune to the desired frequency.
- If you wish to store the radio station to another preset number, press **PRESET** ▼ or ▲ to select the desired preset number.

5 Press **PROGRAM** again.
  → PROGRAM flag will stop flashing, and the station will be stored.

TUNER

- Repeat the above procedure to store other preset stations.

Notes:
- *Press STOP ■ (on the system only) to cancel programming.*
- *During programming, if no button is pressed within 20 seconds, the system will exit program mode automatically.*

Tuning to Preset Radio Stations

- Press **PRESET ▼** or **▲** to select the desired preset number or you can key in the preset number directly from the remote control.
  → The preset number, frequency and waveband appear on the display

Changing the MW tuning grid

(not available for version /30)

The frequency step can be changed if necessary. In North and South America, the frequency step between adjacent channels in the MW band is 10 kHz. In other parts of the world, it is 9 kHz. The frequency step preset in the factory is 9 KHz.

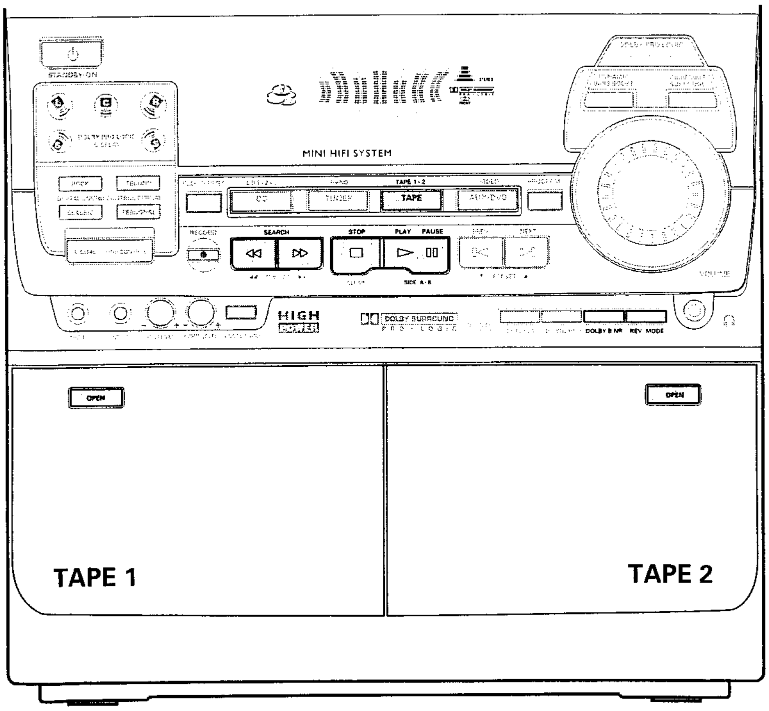
For MW Band
To change from 9 kHz to 10 kHz or vice versa

Changing of tuning grid will erase all previously stored preset stations.

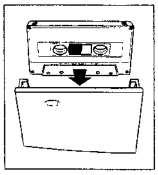
1. Disconnect the system from the AC power supply *(pull out the AC power cord).*
2. Press and hold **TUNER** and **TUNING ▶▶** while reconnecting the system to the AC power supply.
   → Display will show "GRID 10" or "GRID 9".

Notes:
- *GRID 9 indicates that the tuning grid is in step of 9 kHz in MW band. GRID 10 indicates that the tuning grid is in step of 10 kHz in MW band.*
- *FM tuning grid will also be changed from 50 kHz to 100 kHz or vice versa. All preset stations will also be erased.*

TAPE



Loading a tape



- Press **OPEN**.
- The tape deck door opens.
- Load the tape with the open side downward and the full spool to the left.
- Close the tape deck door.

Tape Playback

1. Press **TAPE** to select TAPE mode.
   → "TAPE 1" or "TAPE 2" will be displayed.
- Press **TAPE** again to select either tape deck 1 or tape deck 2.
2. Load the tape into the selected tape deck.
3. Press **PLAY ▶** to start playback.

3a *(For Tape Deck 2 only)*
Press **SIDE A•B** to switch playback between sides A and B.
→ The FRONT or BACK flag appears in the display, depending on the side selected.

3b *(For Tape Deck 2 only)*
Press **REV MODE** to select the different type of play mode *(see auto reverse playback).*

4. Press **STOP ■** to end playback.

Notes:
- *To change side before playback begins, use the SIDE button on the remote control.*
- *When the tape has stopped playing, the system will switch to the standby mode automatically after 15 minutes if no button is pressed.*

TAPE

Auto Reverse Playback *(only on tape deck 2)*

- Press **REV MODE** to select the different play modes.

⌶ .... recording or playback on one side of the tape. The tape stops at the end of one side.

∂ .... recording or playback on both sides of the tape. The tape then stops.

∫ .... continuous playback on both sides of the tape up to a maximum of 20 times per side unless you press **STOP ■**.

Rewind/Fast Forward

At the stop mode

1 You can rewind or fast forward the tape by pressing ◀◀ or ▶▶ respectively.
  → "TAPE 1 XXX" or "TAPE 2 XXX" will be displayed, depending on which tape deck is selected.
  → The tape will stop automatically at the end of rewinding or fast forwarding.
2 Press **STOP ■** to stop rewinding or fast forwarding.

During playback

- Press and hold ◀◀ or ▶▶ respectively until the desired passage is located.
  → During searching, the sound is reduced to a low volume.
  → When you release ◀◀ or ▶▶, the tape continues playing.

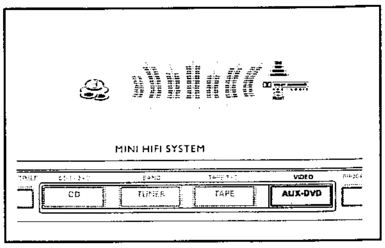
Notes:
- *During rewinding or fast forwarding a tape; it is possible to select another source (e.g. CD, TUNER or AUX•DVD). "XXX" denotes the counter number.*
- *Check and tighten slack tape before use with a pencil. Slack tape may get jammed or may burst in the mechanism.*
- *C-120 tape is extremely thin and is easily deformed or damaged. It is not recommended for use in this system.*
- *Store the tapes at room temperature and do not put them too close to a magnetic field (for example, transformer, TV or loudspeaker boxes).*

Dolby B Noise Reduction System

1 Press **DOLBY B NR** to switch on Dolby B NR.
  → The ᗡᗞ B NR appears in the display.
2 Press **DOLBY B NR** again to switch off Dolby B NR.
  → The ᗡᗞ B NR disappears from the display.

Note:
- *A tape recorded with the Dolby B NR system should also be played in the Dolby B NR mode. If you forget to operate the DOLBY NR button, the treble may be reproduced too strongly.*

AUX•DVD



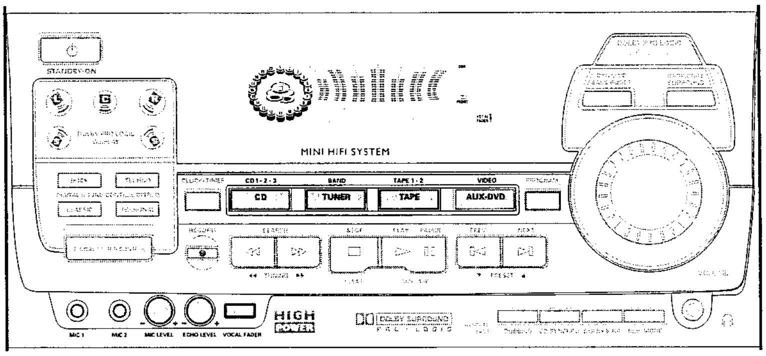
Selecting External Equipment

If you have connected the audio out terminals of the external equipment (TV, VCR, Laser Disc or DVD player) to the AUX IN terminals, you can hear the sound from the system.

- Press **AUX•DVD** to select the external mode.
  → "AUX/DVD" will be displayed.

Note:
- *All the sound control features (e.g. DSC, DBB, etc.) are available for selection.*

KARAOKE



Karaoke *(not available for version /30)*

Microphone mixing

1 Set the **MIC LEVEL** control to the minimum level to prevent acoustic feedback (e.g. a loud howling sound) before you connect the microphone.
2 Connect either 1 or 2 microphones to the **MIC 1** or **MIC 2** socket.
3 Press **CD**, **TUNER**, **TAPE 1** or **AUX•DVD**.
4 Play the selected source.
5 Adjust the volume level with **VOLUME** control.
6 Adjust the **MIC LEVEL** control to the mixing level that you want.
7 Adjust the **ECHO LEVEL** control to the echo level that you want.
8 Press **VOCAL FADER** to suppress the vocals on special recorded Karaoke CDs.
  → When the VOCAL FADER is switched on, the VOCAL FADER flag and "🎤" will be displayed.
9 Start singing or talking through the microphone.

Notes:
- *For maximum VOCAL FADER effect, you are advised to switch off the Incredible Surround.*
- *The Dolby Pro Logic mode will automatically switch to normal stereo mode whenever VOCAL FADER is switched on.*

RECORDING

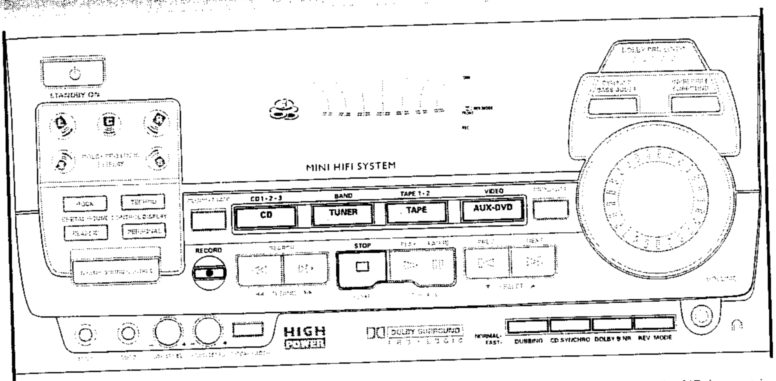
IT IS RECOMMENDED THAT YOU SWITCH OFF DOLBY PRO LOGIC WHEN RECORDING.

Notes:
- *If you do not intend to record via the microphone, unplug the microphone to avoid accidental mixing with other recording source.*
- *For recording, use only tape of IEC type I (normal tape) or IEC type II (Chrome).*
- *The tape is secured at both ends with leader tape. At the beginning and end of tape, nothing will be recorded for six to seven seconds.*
- *The recording level is set automatically, regardless of the position of VOLUME, DBB, Incredible Surround or DPL. Dolby B NR can be selected for Tuner or CD recording.*
- *To prevent accidental recording, break out the tab on the left shoulder of the tape side you want to protect.*
- *If "CHECK TAPE" is displayed, the protection tab has been broken. Put a piece of clear adhesive tape over the opening. Do not cover the Chrome tape detection hole when covering the tab opening.*

Recording the mixed sound / One Touch Recording

- During microphone mixing, you can record the mixed sound on a tape in tape deck 2 except dubbing mode.
- For One Touch Recording, as soon as you press RECORD, the current source (CD, TUNER, TAPE 1 or AUX•DVD) will be recorded on tape deck 2.

1 Load a blank tape in tape deck 2.
2 Press **RECORD ●**.
  → The REC flag is displayed.
3 Press **STOP ■** to stop recording.



Note:
- *When you press RECORD at TAPE 2 mode, "SELECT SOURCE" will be displayed. One Touch Recording is not possible at TAPE 2 mode.*

Recording from other sources *(only on tape deck 2)*

1 Press **TAPE** to select tape deck 2 .
2 Load a blank tape into tape deck 2 with the open side downward.
3 Press **SIDE** on the remote control to select the recording side.
→ The FRONT or BACK flag will be displayed, depending on the side selected.
4 Press **REV MODE** to select the playback mode (⌶ or ∂).
5 Press **DOLBY NR** to record with Dolby NR *(except in TAPE 1 mode)*.
6 Press **CD**, **TUNER**, **TAPE 1** or **AUX•DVD**.
- Start playback of the selected source.

7 Press **RECORD ●** to start recording.
→ The REC flag is displayed.
8 Press **STOP ■** to stop recording.

Notes:
- *Only ⌶ or ∂ mode is available during recording.*
- *During recording, it is not possible to listen to another sound source.*

Dubbing tapes *(from tape deck 1 to tape deck 2)*

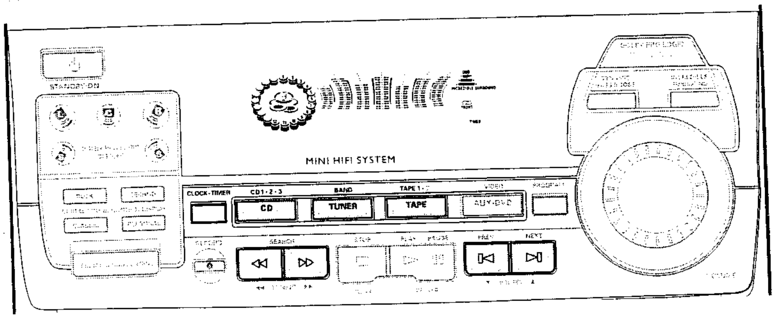
1 Press **TAPE** to select tape deck 2 .
2 Load the prerecorded tape into tape deck 1 and a blank tape into tape deck 2.
3 Press **SIDE** on the remote control to change the desired direction of the play mode.
→ The FRONT or BACK flag will be displayed, depending on the side selected.
4 Press **REV MODE** to select the playback mode (⌶).
5 Press **DUBBING *once*** for normal speed dubbing or ***twice*** for high speed dubbing.
→ Both the tapes in deck 1 and 2 will start rewinding to the front automatically.
→ Dubbing will start immediately after both tapes have finished rewinding.
→ "NORMAL XXX" (normal speed) or "FAST XXX" (high speed) will be displayed.
→ HSD appears on the display for high speed dubbing.
→ The REC flag is displayed.
6 Press **STOP ■** to stop dubbing.

Notes:
- *"XXX" denotes the counter number.*
- *Only ⌶ mode is available during recording.*
- *At the end of side A, flip the tapes to side B and repeat the procedure.*
- *Dubbing of tapes is only possible from tape deck 1 to tape deck 2.*
- *To ensure good dubbing, use tapes of the same length.*
- *During high speed dubbing in Tape mode, the sound is reduced to a low volume.*
- *You can switch to other sound source while dubbing.*
- *Dolby NR button has no influence during dubbing (dubbing from tape deck 1 to tape deck 2). An original tape recorded with Dolby B NR automatically produces a copy with Dolby B NR.*

CD Synchro Start Recording

During CD synchro start recording,
- It is not advisable to fast forward/rewind your tape in tape deck 1.
- It is not possible to listen to another source.

1 Press **CD**.
2 Load a disc into the disc tray.
3 You can program the tracks in the order you want them to be recorded (see Programming Tracks). If not, the tracks are recorded according to the selected disc.
4 Press **TAPE** to select tape deck 2.
5 Load a blank tape (full spool to the left) into tape deck 2.
6 Press **SIDE** on the remote control to change the desired direction of the play mode.
→ The FRONT or BACK flag will be displayed, depending on the side selected.
7 Press **REV MODE** to select the play mode (⌶ or ∂) for tape deck 2.
8 Press **DOLBY NR** to to record with Dolby NR.
9 Press **CD SYNCHRO** to start recording.
→ The REC flag is displayed.
→ After about seven seconds, the CD will start playing. This is to prevent recording on the leader tape at the beginning of the tape.
10 Press **STOP ■** to stop recording CD playback.



View Clock

You can view the clock (if it is set) at standby or any source. It will be displayed for about seven seconds.

- Press **CLOCK•TIMER** briefly.
→ " 10:25" (the current time) will be displayed.
→ "-- : - - -" will be displayed if the clock is not set.

Clock Setting

The clock is set in 24-hour mode, e.g. "00:00" or "23:59". Before setting the clock, you must be in the View Clock mode.

1 Press **CLOCK•TIMER** to select clock mode.
→ "00:00" or the current time starts flashing.
2 Set the hour with ◀◀ or ▶▶.
3 Set the minute with |◀ or ▶|.
4 Press **CLOCK•TIMER** again to store the setting.
→ The clock starts running.

- To exit without storing the setting, press **STOP ■**.

Notes:
- *During clock setting, if no button is pressed within 90 seconds, the system will exit clock setting mode automatically.*
- *When a power interruption occurs, the clock setting is erased.*

TIMER

Timer Setting

- The system can switch on to CD, TUNER or TAPE 1 mode automatically at a preset time. It can serve as an alarm to wake you up. After half an hour from the preset time, the system will return to the standby mode if no button is pressed.
- Before setting the timer, make sure the clock is set correctly.
- The timer has to be reset or start again for each subsequent preset time.
- **The volume of the timer will be at the last setting before the set is switched to standby mode.**

1 Press and hold **CLOCK•TIMER** for more than 2 seconds to select timer mode.
  → "ON 00:00" or the last set timer starts flashing.
  → The TIMER flag starts flashing.
  → The last selected timer source will be lighted in green while the other available sources are flashing.
2 Press **CD**, **TUNER** or **TAPE 1** to select the desired source.
  → The selected timer source will be lighted in green.
3 Press ◀◀ or ▶▶ to set the hour for the timer to start.
4 Press |◀ or ▶| to set the minute for the timer to start.
5 Press **CLOCK•TIMER** to store the start time and the selected source.
  → The TIMER is now set.
  → The TIMER flag remains on the display.

- To exit without storing the setting, press **STOP ■**.
- At the preset time, the TIMER will be activated.
  → The selected source will be played.
  → The TIMER flag disappears from the display.

Notes:
- *During timer setting, if no button is pressed within 90 seconds, the system will exit timer setting mode automatically.*
- *If the source selected is TUNER, the last tuned frequency will be switched on.*
- *If the source selected is CD, playback will begin with the first track of the last selected disc. If the CD trays are empty, the TUNER will be selected instead.*
- *If the source selected is TAPE 1, and if the preset time is reached during high speed dubbing, the TUNER source will be selected instead.*

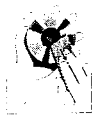
To stop the TIMER
- Press **TIMER ON/OFF** on the remote control.
  → The TIMER is now switched off.
  → The TIMER flag disappears.

To start the TIMER again *(for the same time)*
- Press **TIMER ON/OFF** on the remote control.
  → The TIMER flag is displayed.

MAINTENANCE

Maintenance

Cleaning the Cabinet
- Use a soft cloth slightly moistened with a mild detergent solution. Do not use a solution containing alcohol, spirits, ammonia or abrasives.

Cleaning Discs


- When a disc becomes dirty, clean it with a cleaning cloth. Wipe the disc from the center out.
- Do not use solvents such as benzine, thinner, commercially available cleaners, or antistatic spray intended for analog records.

Cleaning the CD lens
After prolonged usage, dirt or dust may accumulate at the CD lens. To ensure good playback quality, clean the CD lens with Philips CD Lens Cleaner or any commercially available. Follow the instructions supplied with the Lens Cleaner.

Cleaning the Heads and the Tape Paths
- To ensure good recording and playback quality, clean the heads , the capstan(s), and pressure roller(s) after every 50 hours of tape operation.
- Use a cotton swab slightly moistened with cleaning fluid or alcohol.
- You can also clean the heads by playing a cleaning tape through once.

Demagnetizing the heads
- Use a demagnetizing tape available at your dealer.

TROUBLESHOOTING

Warning! Under no circumstances should you try to repair the system yourself, as this will invalidate the warranty.
- If a fault occurs, check the points listed below before taking the system for repair.
- Should any problems persist after you have made these checks, consult your nearest dealer or service center.

CD Player Operation

"NO DISC" is displayed.
- The disc is inserted upside down.
→ *Place CD with printed side up.*
- Moisture condensation at the lens.
→ *Wait until lens has adjusted to normal room temperature.*
- There is no disc in the CD tray.
→ *Insert a CD.*
- The CD is dirty, badly scratched or warped.
→ *Clean or replace the CD.*
- The CD lens is dirty or dusty.
→ *See section under Maintenance.*

Radio Reception

Poor radio reception
- The signal strength is too weak.
→ *Adjust the antenna.*
- The TV or VCR is too close to the stereo system.
→ *Separate the stereo system from the TV or VCR.*
→ *Connect an external antenna for better reception.*

Cannot tune to station
- Wrong tuning grid.
→ *Switch to the correct tuning grid.*

Tape Deck Operation

"RECORDING ACTIVE" is displayed.
- A recording is in progress.
→ *Stop the recording or wait until it is finished.*

"TAPE DUBBING ONLY" is displayed.
- Tape dubbing is only possible in tape mode.
→ *Switch source to tape mode.*

Recording or playback cannot be made or there is a decrease in audio level.
- *Dirty tape heads, capstans or pressure rollers.*
→ *See section on tape deck maintenance.*
- Magnetic build-up in the record/playback head.
→ *Use demagnetizing tape.*

General

System switches to standby mode automatically
- The system is operating in an extremely hot environment or internal heat build-up is high.
→ *This is not a malfunction. The system incorporates a built-in safety feature that prevents overheating.*
→ *Let the system cools down, then switch on again.*

System does not react when any button is pressed.
- Electrostatic discharge.
→ *Press STANDBY-ON to switch the unit off; Remove the AC power plug from the wall outlet, then reconnect and switch on the system again.*

No or poor sound.
- Volume is not turned up.
→ *Adjust VOLUME.*
- The headphones are connected.
→ *Disconnect the headphones.*
- Speakers are not connected or are connected wrongly.
→ *Check that the speakers are connected correctly.*
→ *Make sure that the stripped speaker wire is clamped.*

Reversed left and right sound.
- Speakers are connected wrongly.
→ *Check the speaker connections and location.*

Lack of bass sound or apparently imprecise physical location of musical instruments.
- Speakers are connected wrongly.
→ *Check the speaker connection for proper phasing, red/black wires to red/black terminals.*

Remote control has no effect on the system.
- The distance to the system is too large.
→ *Reduce the distance.*
- Batteries are inserted incorrectly.
→ *Insert the batteries with their polarities (+/– signs) as indicated.*
- Batteries are exhausted.
→ *Replace the batteries.*
- Wrong source is selected.
→ *Select the source (CD, TUNER, etc.) before pressing the function button, (PLAY, PREV/NEXT, etc.).*

Timer not working.
- Timer is not switched on.
→ *Press TIMER ON/OFF on remote control to switch on the timer.*
- Dubbing/recording is in progress.
→ *Stop dubbing/recording.*

System display features automatically and buttons flashing continuously.
- Demonstration mode is switched on.
→ *Press and hold STOP ■ for 3 seconds to switch off the demonstration.*

"SWITCH OFF VOCAL FADER" is displayed.
- Vocal Fader is switched on.
→ *Switched off Vocal Fader.*

"UNPLUG HEADPHONE" is displayed.
- Headphones is connected.
→ *Disconnect the headphones.*

ADDITIONAL FEATURES

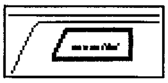
Receiving RDS Radio Station (RDS)

RDS (Radio Data System) is a broadcasting service that allows FM stations to send additional information along with the regular FM radio signal. This additional information can contain:

- **STATION NAME:** The station name is displayed.
- **FREQUENCY:** The frequency of the station is displayed.
- **PROGRAM TYPE:** The following program types exist and can be received by your tuner: News, Affairs, Info, Sport, Educate, Drama, Culture, Science, Varied, Pop M, Rock M, M.O.R. (middle of the road music), Light M, Classics, Other M, No type.
- **RADIO TEXT (RT):** text messages appear in the display.

When you have tuned to a RDS station, the RDS logo (RDS) and the station name will appear on the display:

- The display normally shows the radio station name if available.
  By repeatedly pressing **RDS•CD TEXT** button you can change the type of display information:



→ The display shows in turn:
STATION NAME → PROGRAM TYPE → RADIO TEXT → FREQUENCY → STATION NAME ...

Note:
– When you press the RDS•CD TEXT button and the display shows "NO RDS", it indicates that either the tuned station is not transmitting RDS signal or it is a non RDS station.

RDS Clock

Some RDS station may be transmitting a real clock time at an interval of every minute.

Setting the time with RDS clock

1. Press **CLOCK•TIMER**.
   → "- - : - -" or current time appears on the display.
2. Press **CLOCK•TIMER** once more to enter clock setting mode.
   → "00:00" or current time starts flashing.
3. Press **RDS•CD TEXT**.
   → The message "SEARCH RDS TIME" will be displayed.
   → If the station does not transmit RDS clock, "NO RDS TIME" will be displayed.
   → When the RDS clock is read, "RDS TIME" will be displayed. The current clock time is displayed for 2 seconds and will be stored automatically.
   → If within 90 seconds, the RDS time is not detected, "NO RDS TIME" will be displayed.

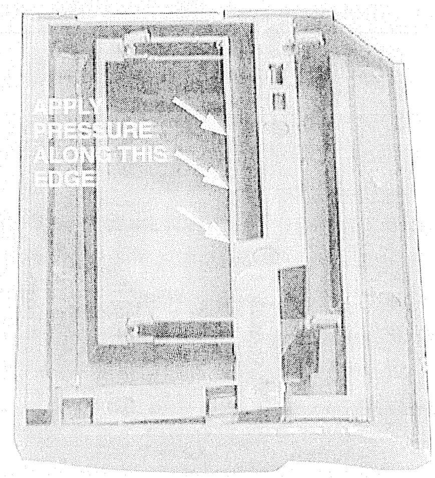
Program Type *(only on remote control)*

You can activate the PROGRAM TYPE function only in Tuner mode. Once the program type is detected in a RDS station, it will switch to the radio station automatically.

1. Press **PTY SEARCH** (Program Type) on the remote control.
   → The following program types exist and can be received by your tuner: News, Affairs, Info, Sport, Educate, Drama, Culture, Science, Varied, Pop M, Rock M, M.O.R. (middle of the road music), Light M, Classics, Other M, No type.
2. Press ⏮ or ⏭ on the system to select the desired program type.
3. Press **PTY SEARCH** on the remote control again to confirm the selection.
   → It will search for the first available RDS station with the selected program type.
   → If no RDS station is found with the selected program type, the display will show "TYPE NOT FOUND".

DISMANTLING INSTRUCTIONS

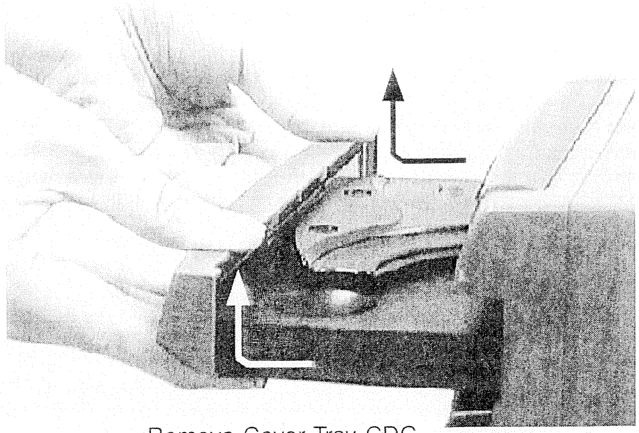
Dismantling of the Cassette Cover



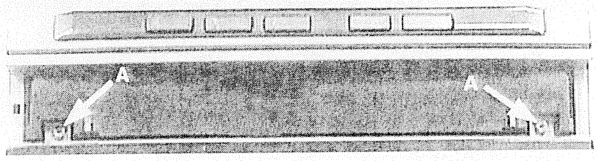
Cassette door

Dismantling of the CDC Module and Front Panel

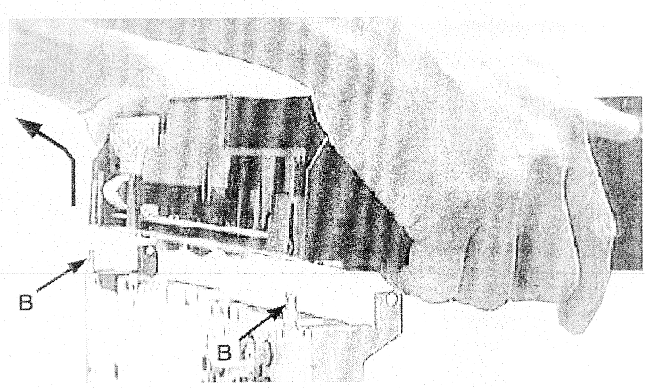
1) Loosen the 17 screws to remove the Cabinet Rear (pos 289).
   - 5 screws each on the left & right side of the Cabinet
   - 7 screws at the rear of the Cabinet
2) Remove the Plate EMC (pos. 286).
3) Slide out the tray and remove the Cover Tray CDC (pos 256) as indicated.
4) Loosen the 2 screws A and 2 screws B to remove the CDC Module (pos 1104) as indicated.
5) Remove 1 screw P (see Rear Plate & Power Module picture) to loosen the Metal Bar (pos 282).
6) Place the set on its left side and remove 1 screw at the bottom of the Front Cabinet (pos 200) to separate the Front Panel assembly from the Bottom Plate (pos 291).



Remove Cover Tray CDC



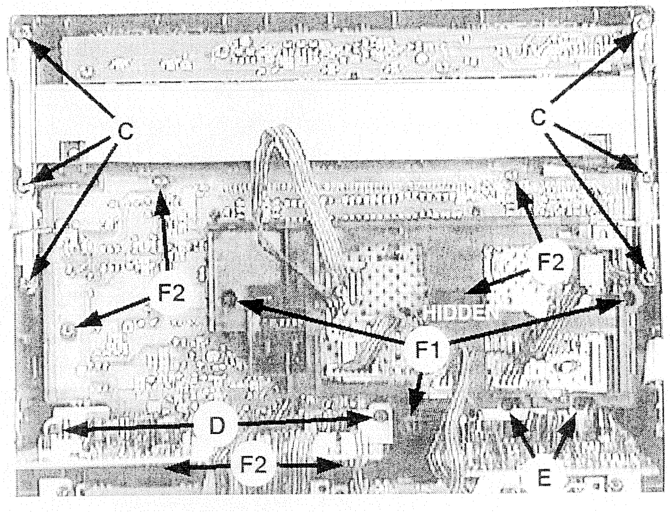
Front CDC



Remove CDC Module

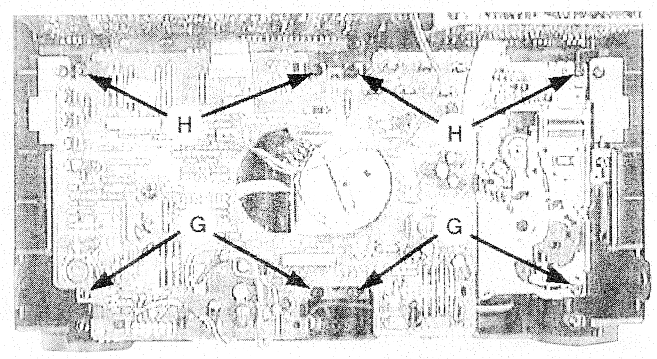
Dismantling of the Front Board

1) Remove 1 screw to loosen the Dolby Pro-logic board (pos 1107) and lift the Metal Bar (pos 282) out of the Front Plate (pos 264).
2) Remove 6 screws C as indicated to take out the CDC Left and Right Bracket (pos 272 and 273).
3) Remove 2 screws D as indicated to loosen the AF Board (pos 1101-A).
4) Remove 2 screws E as indicated to loosen the Karaoke Board (pos 1106 - only for Karaoke version).
5) Remove 3 screws F1 as indicated to loosen the Front Plate (pos 264) and Sandwich Board (pos 1102-B).
6) Remove 6 screws F2 (1 hidden screw) as indicated to loosen the Front Board (pos 1102-A).



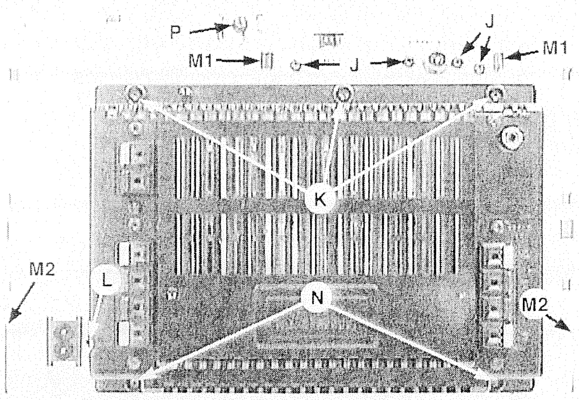
Dismantling of the ETF Module

1) Remove 8 screws (4 screws G and 4 screws H) as indicated to loosen the ETF5 Module (pos 1105).



Dismantling of Rear Plate and Power Module

1) Remove 4 screws J and uncatch M1 to loosen the Tuner Board (pos 1100).
2) Remove 3 screws K, 1 screw L (if obstructed) and uncatch M2 to take out the Rear Plate (pos 280).
3) Remove 2 screws N to free the Power Module (pos 1103) from the Bottom Plate assembly.

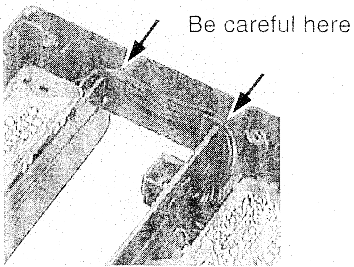


Repair Hints

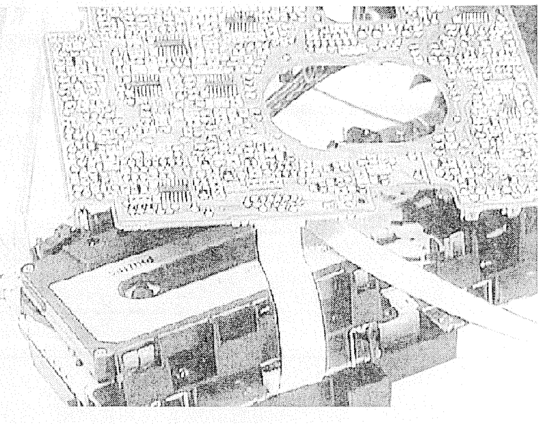
1) During re-assembly Front board, care should be taken to dress the thin bunch of wires (between Front board & CDC Key board) properly in the slots provided so that it will not be damaged by the CDC bracket (pos 272). See picture 1

2) During repair it is possible to disconnect the Tuner board and CDC Module completely unless the fault is suspected to be in that area. This will not affect the performance of the rest of the set.

3) Due to short flex cable wires in the ETF Module, the pc board should be disconnected and reconnected on the reverse side of the tape mechanism to keep it electrically connected during repair. See picture 2

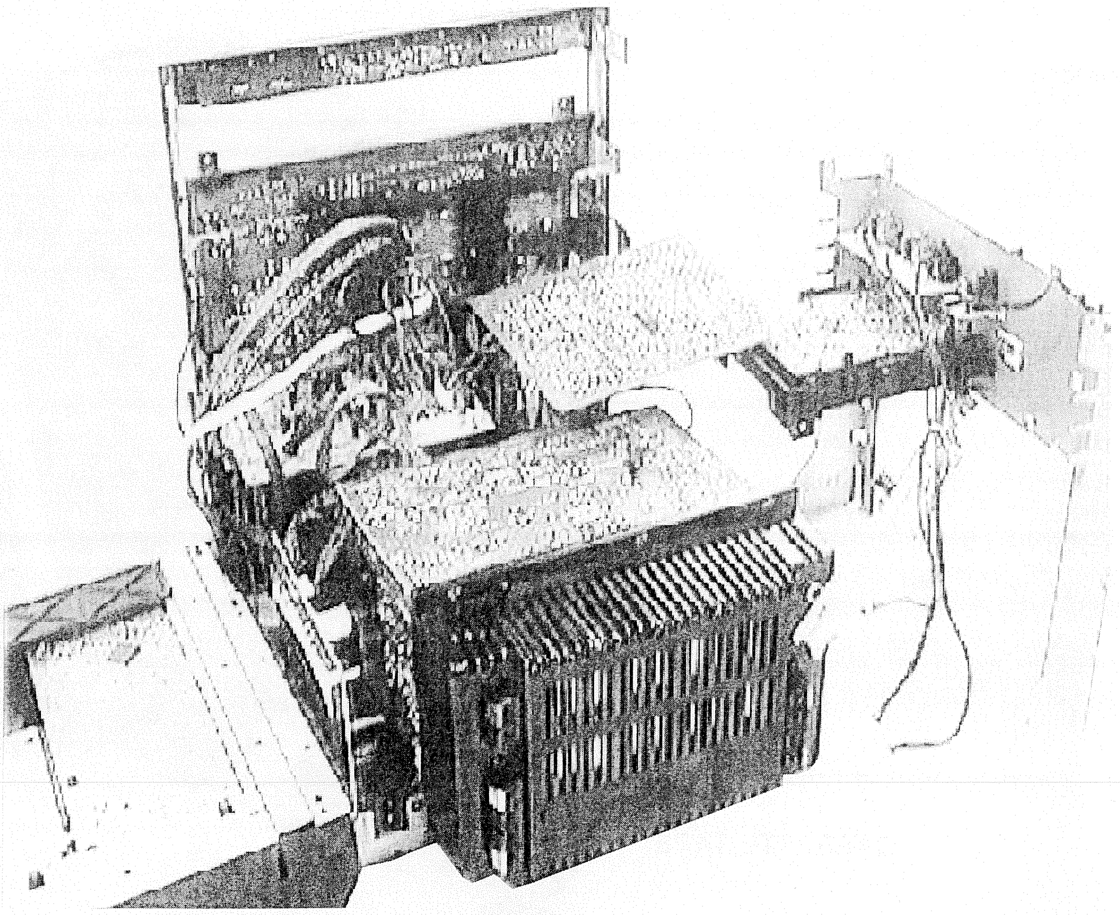


Picture 1

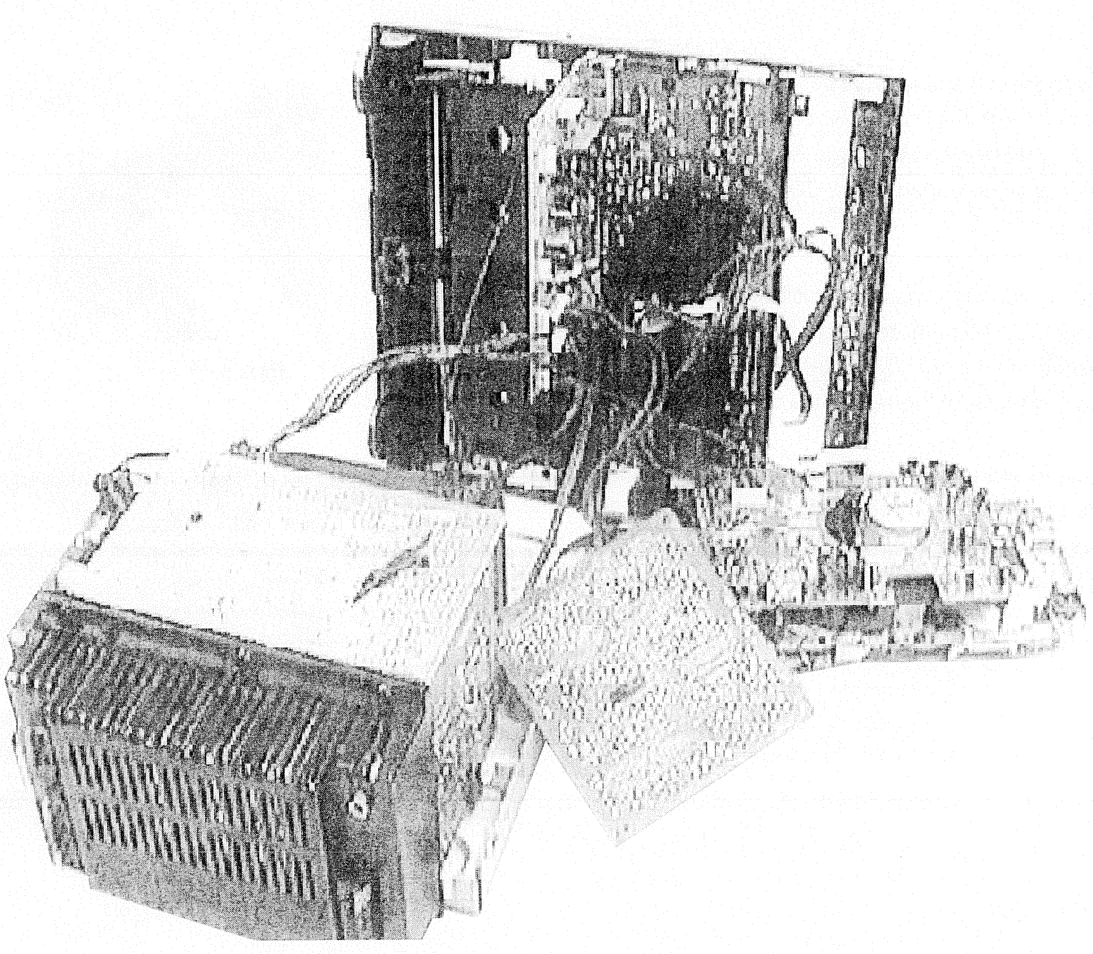


Picture 2

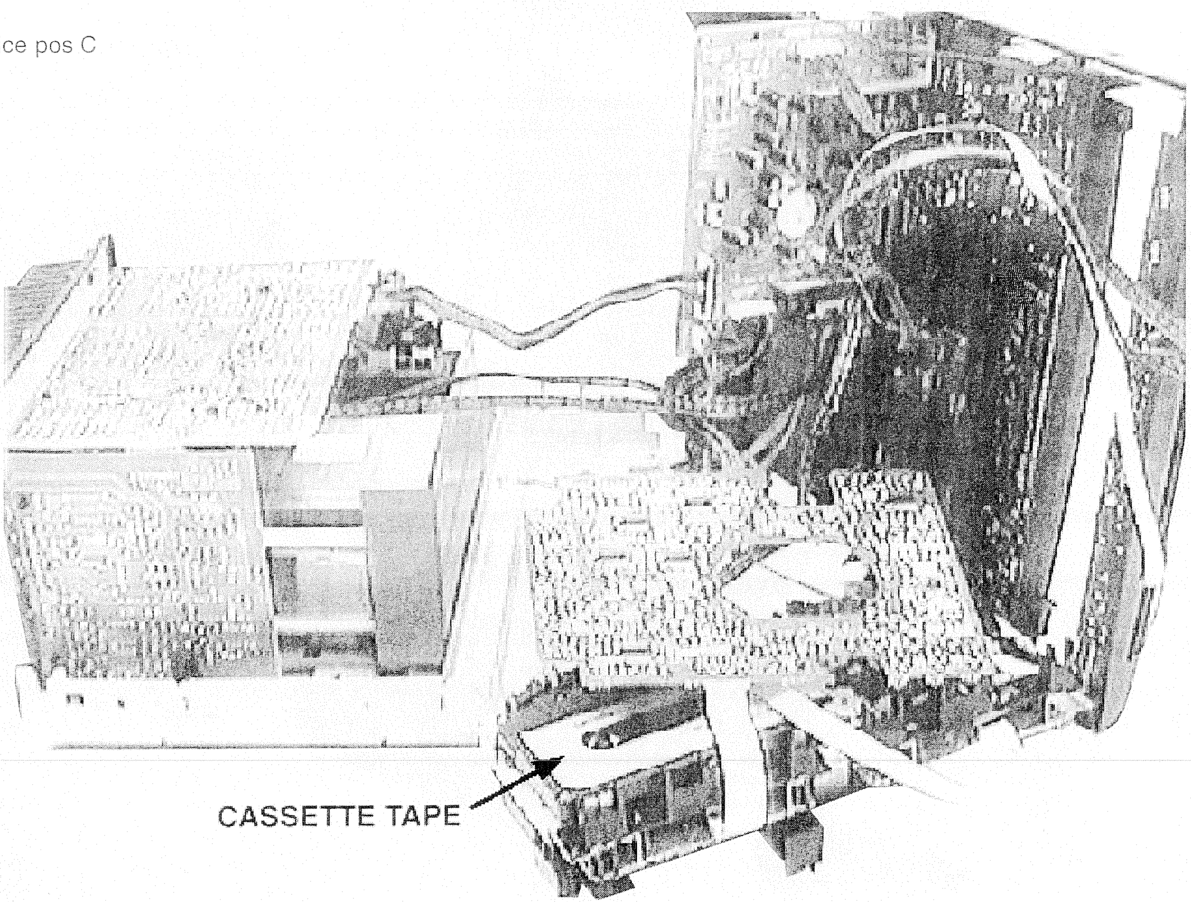
Service pos A



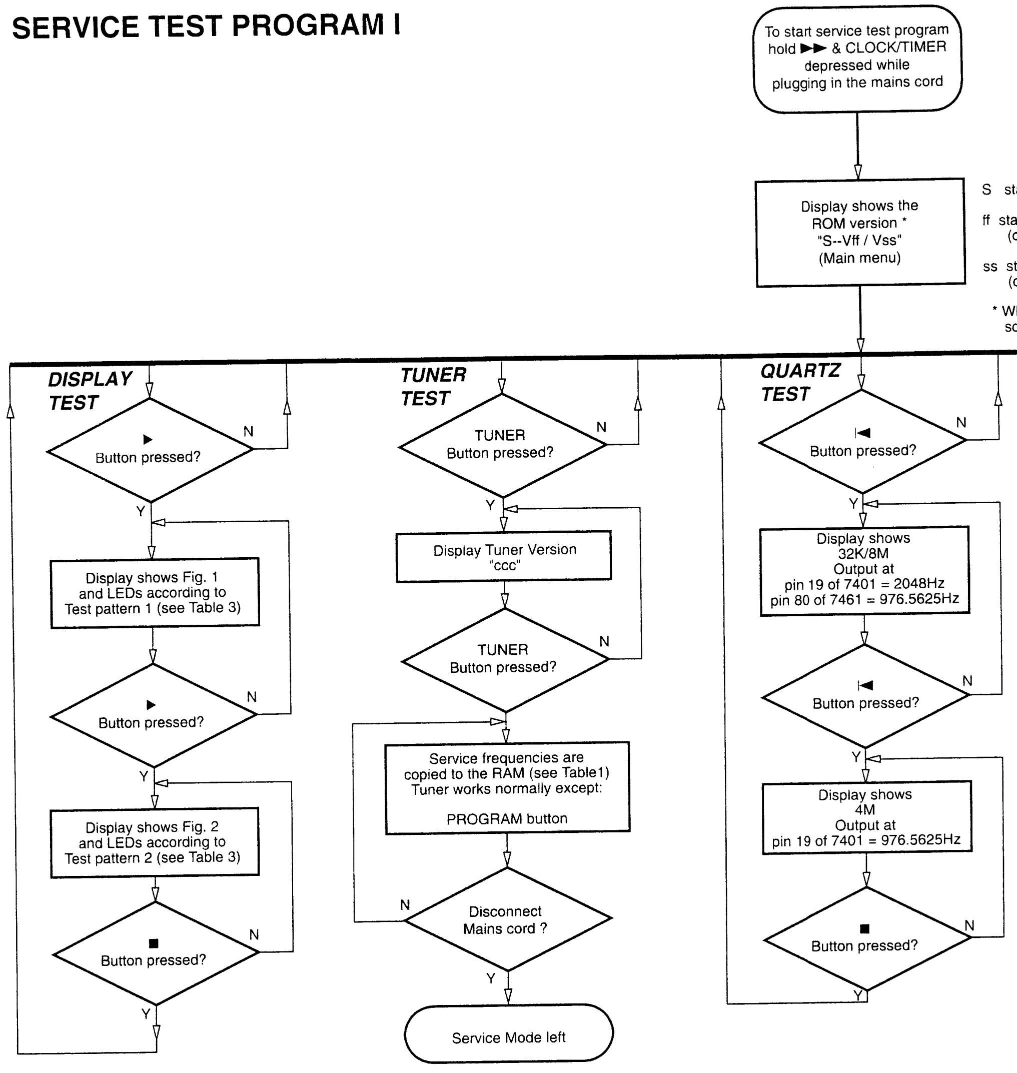
Service pos B



Service pos C


CASSETTE TAPE

SERVICE TEST PROGRAM I


To start service test program hold ►► & CLOCK/TIMER depressed while plugging in the mains cord
Display shows the ROM version * "S--Vff / Vss" (Main menu)
DISPLAY TEST
► Button pressed?
N
Y
Display shows Fig. 1 and LEDs according to Test pattern 1 (see Table 3)
► Button pressed?
Display shows Fig. 2 and LEDs according to Test pattern 2 (see Table 3)
■ Button pressed?
TUNER TEST
TUNER Button pressed?
Display Tuner Version "ccc"
TUNER Button pressed?
Service frequencies are copied to the RAM (see Table1) Tuner works normally except: PROGRAM button
Disconnect Mains cord ?
Service Mode left
QUARTZ TEST
|◄ Button pressed?
Display shows 32K/8M Output at pin 19 of 7401 = 2048Hz pin 80 of 7461 = 976.5625Hz
|◄ Button pressed?
Display shows 4M Output at pin 19 of 7401 = 976.5625Hz
■ Button pressed?

S stands for Service Test program

ff stands for software version of the µProcessor on Front Display Board (counted from 01 upwards)

ss stands for software version of the µProcessor on Front Sandwich Board (counted from 01 upwards)

* When a mismatch between the 2 µProcessors happen, it will scroll "UNMATCHED FRONT" or "UNMATCHED SANDWICH"

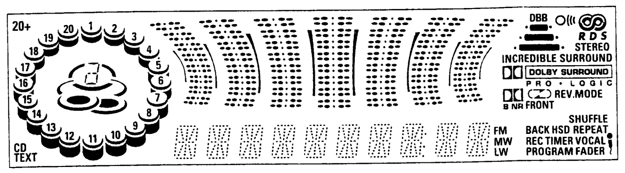

DBB
RDS
STEREO
INCREDIBLE SURROUND
DOLBY SURROUND
PRO LOGIC
REV MODE
NR FRONT
SHUFFLE
BACK HSD REPEAT
FM
MW
LW
REC TIMER VOCAL
PROGRAM FADER
CD TEXT

Figure 1

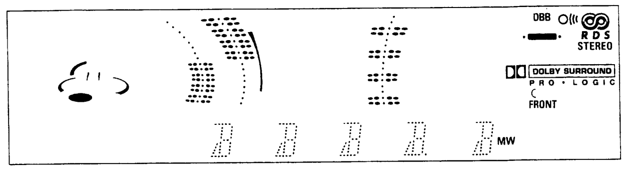
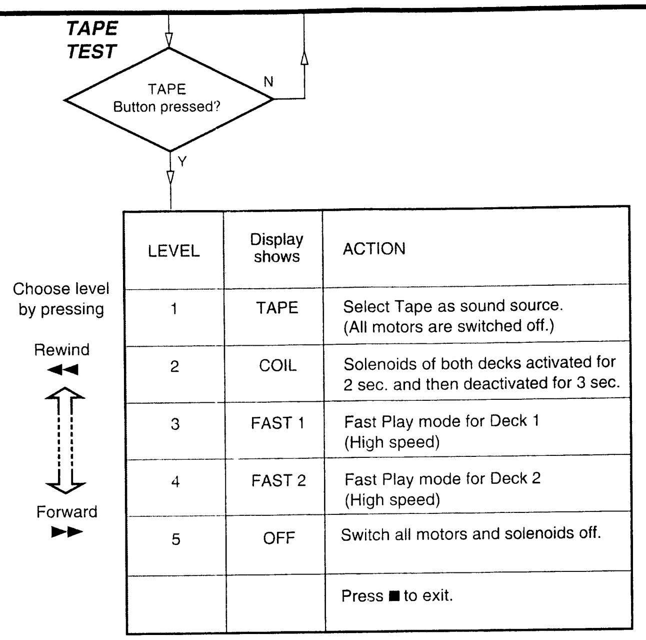
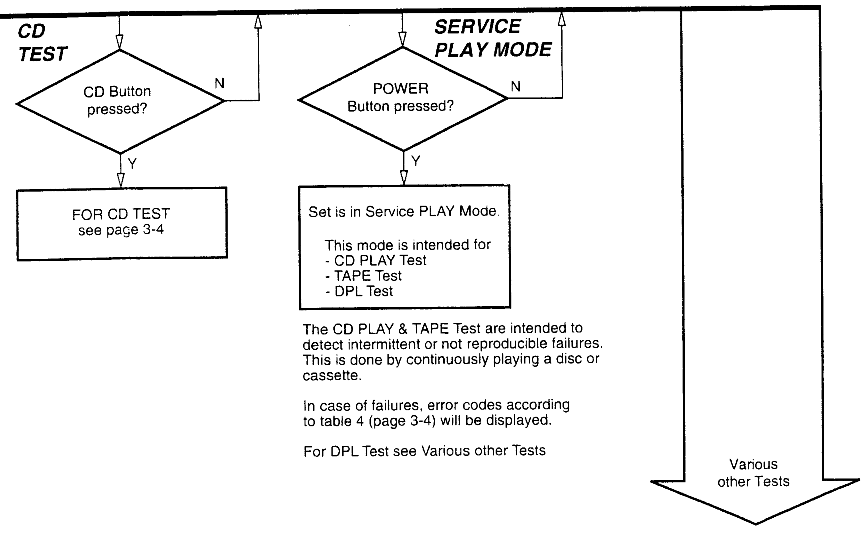

DBB
RDS
STEREO
DOLBY SURROUND
PRO LOGIC
FRONT
MW

Figure 2


TAPE TEST
TAPE Button pressed?
N
Y
Choose level by pressing
Rewind ◄◄
Forward ►►

LEVEL	Display shows	ACTION
1	TAPE	Select Tape as sound source. (All motors are switched off.)
2	COIL	Solenoids of both decks activated for 2 sec. and then deactivated for 3 sec.
3	FAST 1	Fast Play mode for Deck 1 (High speed)
4	FAST 2	Fast Play mode for Deck 2 (High speed)
5	OFF	Switch all motors and solenoids off.
		Press ■ to exit.


CD TEST
CD Button pressed?
N
Y
FOR CD TEST see page 3-4
SERVICE PLAY MODE
POWER Button pressed?
Various other Tests

Set is in Service PLAY Mode.

This mode is intended for
- CD PLAY Test
- TAPE Test
- DPL Test

The CD PLAY & TAPE Test are intended to detect intermittent or not reproducible failures. This is done by continuously playing a disc or cassette.

In case of failures, error codes according to table 4 (page 3-4) will be displayed.

For DPL Test see Various other Tests

PRESET	Europe "EUR"	East Eur. 3-band "EAS"	East Eur. 2-band "EAS"	USA "USA"	Oversea "OSE"	Korea "KOR"	Japan "JAP"
1	87.5MHz	65.81MHz	65.81MHz	87.5MHz	87.5MHz	87.5MHz	76MHz
2	108MHz	108MHz	108MHz	108MHz	108MHz	108MHz	CH3 107.75MHz
3	531kHz	74MHz	74MHz	530kHz	531/530kHz	531kHz	90MHz
4	1602kHz	87.5MHz	87.5MHz	1700kHz	1602/1700kHz	1602kHz	CH1 95.75MHz
5	558kHz	531kHz	531kHz	560kHz	558/560kHz	558kHz	CH2 101.75MHz
6	1494kHz	1602kHz	1602kHz	1500kHz	1494/1500kHz	1494kHz	531kHz
7	153kHz	558kHz	558kHz	98MHz	87.5MHz	87.5MHz	1602kHz
8	279kHz	1494kHz	1494kHz	87.5MHz	87.5MHz	87.5MHz	558kHz
9	198kHz	153kHz	98MHz	87.5MHz	87.5MHz	87.5MHz	1494kHz
10	98MHz	279kHz	70.01MHz	87.5MHz	87.5MHz	87.5MHz	80MHz
11	87.5MHz	198kHz	65.81MHz	87.5MHz	98MHz	98MHz	76MHz

Table 1

East Europe TUNER IF offset correction

1) Input a reference frequency 87.5MHz from the generator.

2) Proceed to the Tuner Test Mode

3) Hold TUNER button down for > 3 seconds

4) The set will self-calibrate automatically and display "OFS-xx" when calibration is successful, otherwise it will display "00E".

xx : offset value between -3 to +3

Note: This has to be done whenever the Eeprom, Microprocessor or the components in the oscillator circuitry are replaced.

Temperature °C	Display shows
30	245
35	241
40	236
45	230
50	224
55	217
60	209
65	201
70	192
75	183
80	173
85	163
90	153
95	143
100	133
105	123
110	114
115	105
120	97
125	89
130	81
135	74
140	68
145	62
150	57

Table 2

LED	Test pattern 1	Test pattern 2
CD1	Green	Green
CD2	Green	Red
CD3	Green	Green
Surr. Left	On	On
Left	On	Off
Center	On	On
Right	On	Off
Surr. Right	On	On
Rock	On	Off
Classic	On	On
Techno	On	Off
Personnal	On	Off
CD	Green	Green
Tuner	Green	Red
Tape	Green	Green
Aux	Green	Red
Rewind	On	On
F. Forward	On	Off
Stop	On	Off
Play	On	On
Pause	On	On
Prev	On	Off
Next	On	Off
DBB	Off	On
IS	On	On

Table 3

TEST	***Activated with***	***ACTION***
EEPROM TEST	►► ■ to Exit	A test pattern will be sent to the EEPROM. "PASS" is displayed if the uProcessor 7461 read back the test pattern correctly, otherwise "ERR" will be displayed.
EEPROM FORMAT	◄◄	Load default data. Display shows "NEW" for 1 second. ***Caution! All presets from the customer will be lost!!***
KEY TEST	►| ■ to Exit	Key numbers according table 5 are shown on the display. (see page 3-4)
FAST CLOCK TEST	CLOCK/TIMER	The clock is switched to fast mode. "FAST" is displayed for 1 sec. Press CLOCK/TIMER again to reset the clock to normal. "NORMAL" displayed for 1 sec.
TEMPERATURE TEST	AUX ■ to Exit	Temperature of the mains transformer as monitored by the NTC resistor is displayed. Refer to Table 2 for conversion of displayed numeric into °C.
SPECTRUM ANALYSER TEST	PROGRAM ■ to Exit	Inject a Signal into the AUX input. The display shows "SA xxx/yyy" where "xxx" and "yyy" is between 0 - 255 representing channel 1 and 2 respectively
VOLUME TEST	Volume Knob or Volume Up/Down	Display shows volume value for 2 seconds. Volume increases or decreases in steps of 1 until 0 (Min.) or 40 (Max.) is reached.
DPL TEST (only possible in Service Play mode)	PRO-LOGIC	The set enters into Pro-logic install mode. The noise-source switches between Left, Center, Right and Rear speakers. Pro-logic settings cannot be install in this test.
LEAVE SERVICE TESTPROGRAM	Disconnect mains cord	

Error code	Type	Error Description
E1000	W	Focus Error Triggered when the focus could not be found within a certain time when starting up the CD or when the focus is lost for a certain time during play.
E1001	W	Radial Error Triggered when the radial servo is off-track for a certain time during play.
E1002	W	Sledge In Error The sledge did not reach its inner position (inner-switch is still close) before approximately 6 Sec. have passed. Inner-switch or sledge motor problem.
E1003	W	Sledge Out Error The sledge did not come out of its inner position (inner-switch is still open) before approximately 250 mSec. have passed by. Inner-switch or sledge motor problem.
E1005	W	Jump-offtrack error Triggered in normal play when the jump destination could not be found within a certain time.
E1006	W	Subcode Error (no subcode within time) Triggered when a new subcode was missing for a certain time during play.
E1007	W	PLL Error The Phase Lock Loop could not lock within a certain time.
E1008	W	Turntable Motor Error Generated when the CD could not reached 75% of speed during startup within a certain time. Discmotor problem.
E1020	F	Focus Search Error The focus point has not been found within a certain time.
E1070	W	The carousel switch is not open within a certain time. This can happen when either the switch is defective and closed all the time, or when the carousel is blocked when located exactly at a disc position.
E1071	W	The carousel position switch did not close within a certain time. This can happen when the switch is defective and never closes electrically, or when the carousel is blocked in between two disc positions. The time-out is approximately 5 Sec.
E1079	W	The drawer could not enter the inside position is opening again. This can be caused because the drawer is blocked by something and cannot go fully inside, or the drawer switch is defective and does not close.
E2020	F	Head Movement Error Deck 1 Generated if the head does not reach the desired position within a certain time.
E2021	F	Head Movement Error Deck 2 Generated if the head does not reach the desired position within a certain time.

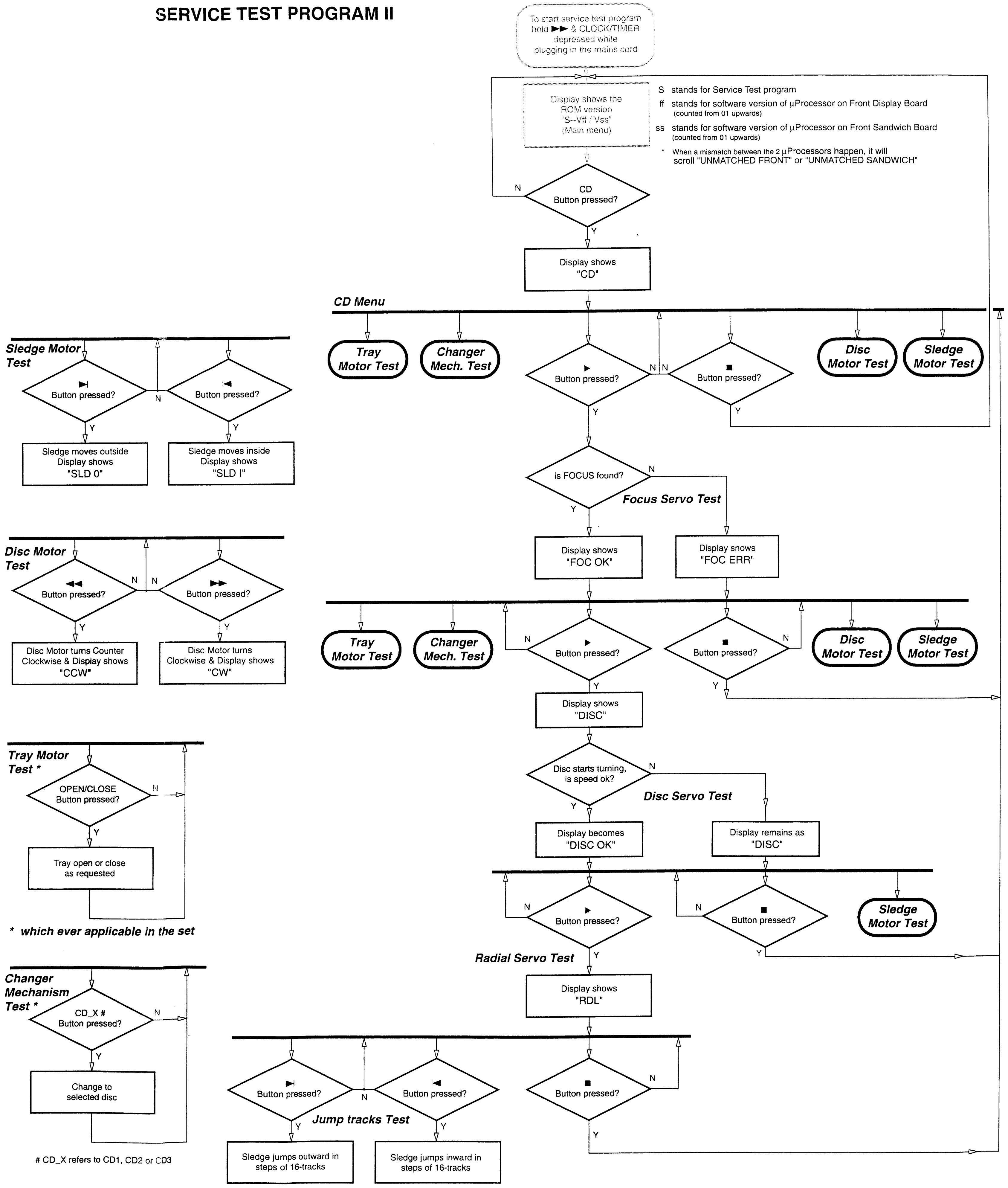
F = Fatal error & the set stop play function W = Warning

Table 4

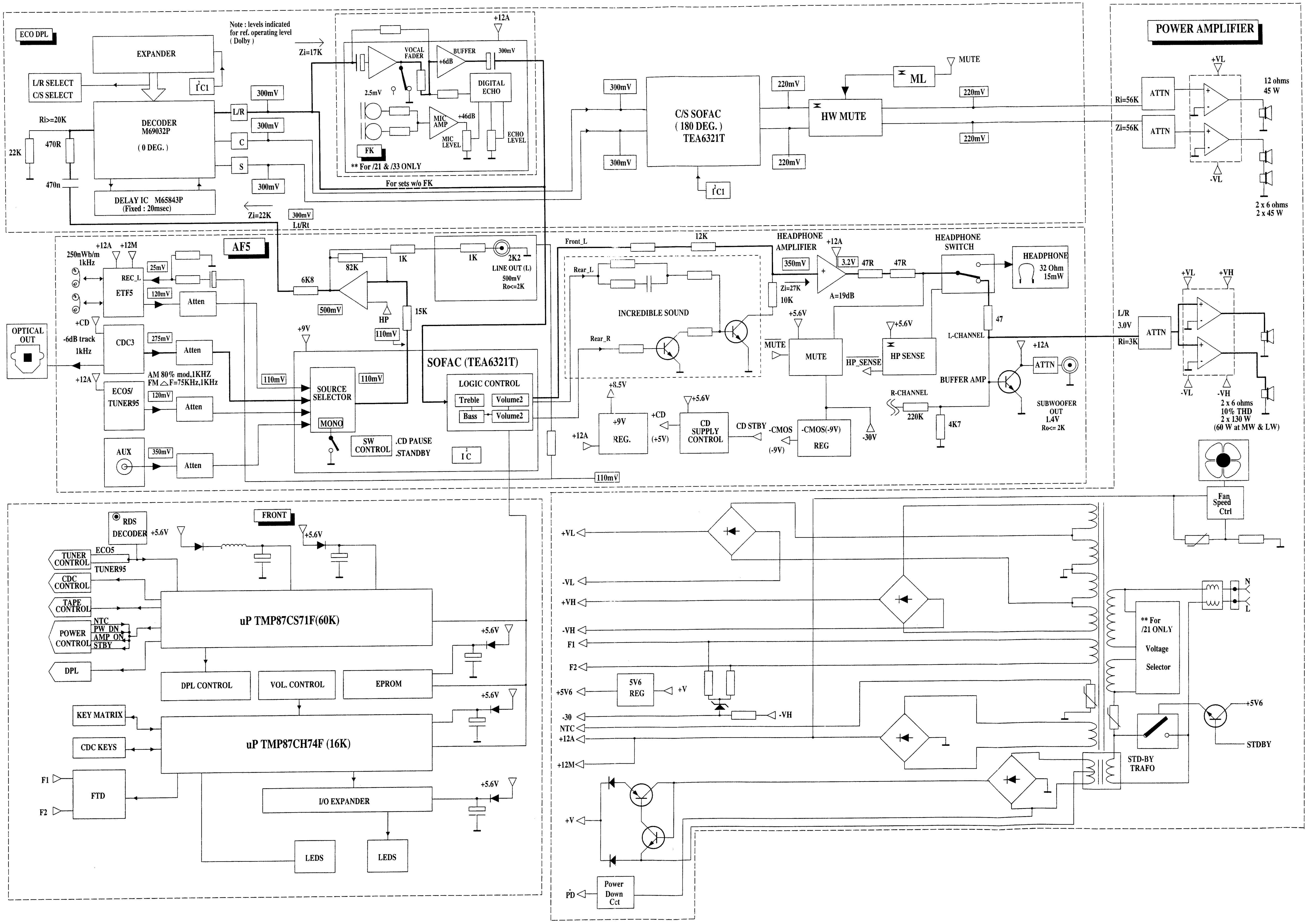
Keys activated	Display shows	Keys activated	Display shows	Keys activated	Display shows
No Key pressed	--	DBB	9	◀◀	19
Any Remote control key	RC	INCREDIBLE SURROUND	10	▶▶	20
CD TEXT	1	CLOCK / TIMER	11	■ (Exit Test)	
CD1	2	CD	12	▶II	22
CD2	3	TUNER	13	I◀	23
CD3	4	TAPE	14	▶I	24
DISC CHANGE	5	AUX	15	TAPE DUBBING	25
OPEN / CLOSE	6	PROGRAM	16	CD SYNC	26
STANDBY • ON	7	DSC	17	TAPE DOLBY	27
DPL	8	RECORD	18	TAPE MODE	28

Table 5

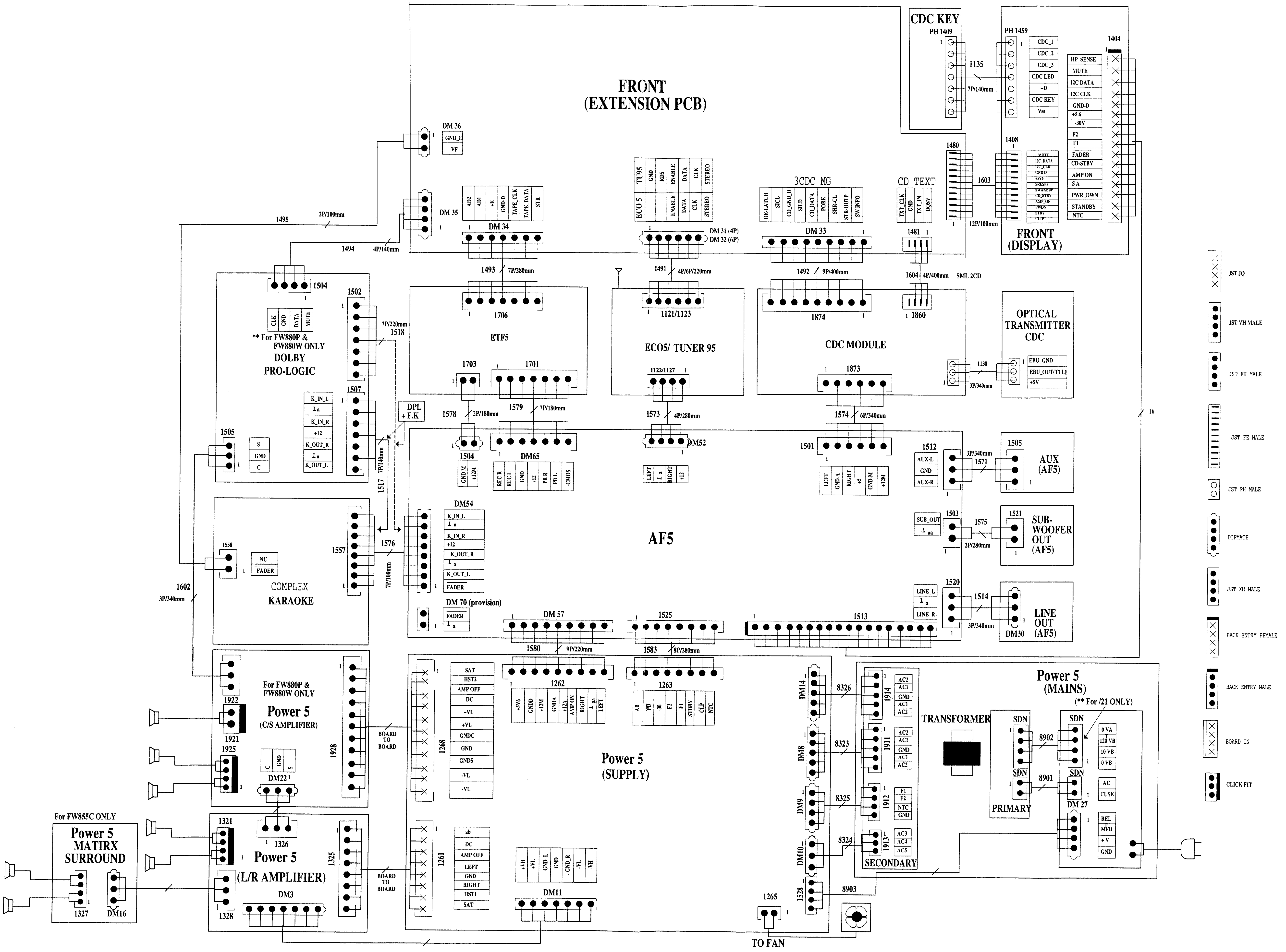
SERVICE TEST PROGRAM II


To start service test program hold ▶▶ & CLOCK/TIMER depressed while plugging in the mains cord
Display shows the ROM version "S--Vff / Vss" (Main menu)
S stands for Service Test program
ff stands for software version of µProcessor on Front Display Board (counted from 01 upwards)
ss stands for software version of µProcessor on Front Sandwich Board (counted from 01 upwards)
* When a mismatch between the 2 µProcessors happen, it will scroll "UNMATCHED FRONT" or "UNMATCHED SANDWICH"
CD Button pressed?
N
Y
Display shows "CD"
CD Menu
Tray Motor Test
Changer Mech. Test
▶ Button pressed?
■ Button pressed?
Disc Motor Test
Sledge Motor Test
is FOCUS found?
Focus Servo Test
Display shows "FOC OK"
Display shows "FOC ERR"
Display shows "DISC"
Disc starts turning, is speed ok?
Disc Servo Test
Display becomes "DISC OK"
Display remains as "DISC"
Radial Servo Test
Display shows "RDL"
▶I Button pressed?
I◀ Button pressed?
Jump tracks Test
Sledge jumps outward in steps of 16-tracks
Sledge jumps inward in steps of 16-tracks
Sledge Motor Test
Sledge moves outside Display shows "SLD 0"
Sledge moves inside Display shows "SLD I"
Disc Motor Test
◀◀ Button pressed?
▶▶ Button pressed?
Disc Motor turns Counter Clockwise & Display shows "CCW"
Disc Motor turns Clockwise & Display shows "CW"
Tray Motor Test *
OPEN/CLOSE Button pressed?
Tray open or close as requested
* which ever applicable in the set
Changer Mechanism Test *
CD_X # Button pressed?
Change to selected disc
# CD_X refers to CD1, CD2 or CD3

SET BLOCK DIAGRAM


ECO DPL
EXPANDER
Note : levels indicated for ref. operating level (Dolby)
Zi=17K
L/R SELECT
C/S SELECT
I²C1
DECODER M69032P
(0 DEG.)
Ri>=20K
22K
470R
470n
L/R
C
S
300mV
300mV
300mV
DELAY IC M65843P (Fixed : 20msec)
Zi=22K
300mV
Lt/Rt
+12A
VOCAL FADER
BUFFER
+6dB
300mV
2.5mV
DIGITAL ECHO
MIC AMP
+46dB
MIC LEVEL
ECHO LEVEL
FK
** For /21 & /33 ONLY
For sets w/o FK
300mV
300mV
C/S SOFAC (180 DEG.) TEA6321T
I²C1
220mV
220mV
ML
MUTE
HW MUTE
220mV
220mV
POWER AMPLIFIER
+VL
Ri=56K
Zi=56K
ATTN
ATTN
-VL
12 ohms 45 W
2 x 6 ohms 2 x 45 W
AF5
+12A
+12M
250nWb/m 1kHz
REC_L
ETF5
25mV
120mV
Atten
+CD
-6dB track 1kHz
CDC3
275mV
Atten
OPTICAL OUT
+12A
ECO5/ TUNER95
AM 80% mod,1KHZ FM △F=75KHz,1KHz
120mV
Atten
AUX
350mV
Atten
6K8
82K
1K
500mV
HP
15K
110mV
1K
2K2
LINE OUT (L)
500mV Ro<=2K
+9V
110mV
SOURCE SELECTOR
110mV
MONO
SW CONTROL
.CD PAUSE
.STANDBY
SOFAC (TEA6321T)
LOGIC CONTROL
Treble
Volume2
Bass
Volume2
I²C
110mV
Front_L
12K
Rear_L
INCREDIBLE SOUND
Rear_R
Zi=27K
10K
HEADPHONE AMPLIFIER
+12A
350mV
3.2V
47R
47R
A=19dB
HEADPHONE SWITCH
HEADPHONE 32 Ohm 15mW
47
L-CHANNEL
+5.6V
MUTE
MUTE
HP_SENSE
+5.6V
HP SENSE
+12A
ATTN
BUFFER AMP
R-CHANNEL
220K
4K7
SUBWOOFER OUT 1.4V Ro<= 2K
+8.5V
+12A
+9V REG.
+CD (+5V)
+5.6V
CD SUPPLY CONTROL
CD STBY
-CMOS (-9V)
-CMOS(-9V) REG
-30V
L/R 3.0V Ri=3K
ATTN
+VL
+VH
-VL
-VH
2 x 6 ohms 10% THD 2 x 130 W (60 W at MW & LW)
Fan Speed Ctrl
RDS DECODER
+5.6V
FRONT
+5.6V
TUNER CONTROL
ECO5
TUNER95
CDC CONTROL
TAPE CONTROL
POWER CONTROL
NTC
PW_DN
AMP_ON
STBY
uP TMP87CS71F(60K)
+5.6V
DPL
DPL CONTROL
VOL. CONTROL
EPROM
+5.6V
KEY MATRIX
CDC KEYS
uP TMP87CH74F (16K)
F1
F2
FTD
+5.6V
I/O EXPANDER
LEDS
LEDS
+VL
-VL
+VH
-VH
F1
F2
+5V6
5V6 REG
+V
-30
-VH
NTC
+12A
+12M
+V
PD
Power Down Cct
N
L
** For /21 ONLY
Voltage Selector
+5V6
STDBY
STD-BY TRAFO

SET WIRING DIAGRAM


FRONT
(EXTENSION PCB)
CDC KEY
PH 1409
1135
7P/140mm
PH 1459
CDC_1
CDC_2
CDC_3
CDC LED
+D
CDC KEY
Vss
1404
HP_SENSE
MUTE
I2C DATA
I2C CLK
GND-D
+5.6
-30V
F2
F1
FADER
CD-STBY
AMP ON
S A
PWR_DWN
STANDBY
NTC
1480
1408
1603
12P/100mm
FRONT
(DISPLAY)
DM 36
GND_E
VF
DM 35
1495
2P/100mm
1494
4P/140mm
DM 34
AD2
AD1
+E
GND-D
TAPE_CLK
TAPE_DATA
STR
TU95
ECO 5
GND
RDS
ENABLE
DATA
CLK
STEREO
DM 31 (4P)
DM 32 (6P)
3CDC MG
OE-LATCH
SICL
CD_GND_D
SILD
CD_DATA
PORE
SHR-CL
STR-OUTP
SW INFO
DM 33
CD TEXT
TXT_CLK
GND
TXT_IN
DQSV
1481
1493
7P/280mm
1491
4P/6P/220mm
1492
9P/400mm
1604
4P/400mm
SML 2CD
1504
CLK
GND
DATA
MUTE
** For FW880P &
FW880W ONLY
DOLBY
PRO-LOGIC
1502
7P/220mm
1518
1706
ETF5
1703
1701
1121/1123
ECO5/ TUNER 95
1122/1127
1874
CDC MODULE
1873
1860
OPTICAL
TRANSMITTER
CDC
1138
3P/340mm
EBU_GND
EBU_OUT(TTL)
+5V
1507
K_IN_L
⊥a
K_IN_R
+12
K_OUT_R
⊥a
K_OUT_L
DPL
+F.K
1505
S
GND
C
1578
2P/180mm
1579
7P/180mm
1573
4P/280mm
1574
6P/340mm
1504
GND M
+12M
DM65
REC R
REC L
GND
+12
PB R
PB L
-CMOS
DM52
LEFT
⊥a
RIGHT
+12
1501
LEFT
GND-A
RIGHT
+5
GND-M
+12M
1512
AUX-L
GND
AUX-R
3P/340mm
1571
1505
AUX
(AF5)
1517
7P/140mm
DM54
K_IN_L
⊥a
K_IN_R
+12
K_OUT_R
⊥a
K_OUT_L
FADER
1558
NC
FADER
1557
1576
7P/100mm
AF5
1503
SUB_OUT
⊥aa
1575
2P/280mm
1521
SUB-
WOOFER
OUT
(AF5)
16
COMPLEX
KARAOKE
1602
3P/340mm
DM 70 (provision)
FADER
⊥a
DM 57
1525
1513
1520
LINE_L
⊥a
LINE_R
1514
3P/340mm
DM30
LINE
OUT
(AF5)
1580
9P/220mm
1583
8P/280mm
For FW880P &
FW880W ONLY
Power 5
(C/S AMPLIFIER)
1922
1921
1925
C
GND
S
DM22
1928
BOARD
TO
BOARD
1268
SAT
HST2
AMP OFF
DC
+VL
+VL
GNDC
GND
GNDS
-VL
-VL
1262
+5V6
GNDD
+12M
GNDA
+12L
AMP ON
RIGHT
⊥aa
LEFT
1263
AB
PB
-30
F2
F1
STDBY
CLP
NTC
Power 5
(SUPPLY)
DM14
8326
1914
AC2
AC1
GND
AC1
AC2
DM8
8323
1911
AC2
AC1
GND
AC1
AC2
DM9
8325
1912
F1
F2
NTC
GND
DM10
8324
1913
AC3
AC4
AC5
SECONDARY
1528
8903
Power 5
(MAINS)
(** For /21 ONLY)
TRANSFORMER
SDN
8902
SDN
0 VA
120 VB
10 VB
0 VB
SDN
8901
SDN
AC
FUSE
PRIMARY
DM 27
REL
MFD
+V
GND
For FW855C ONLY
Power 5
MATIRX
SURROUND
1327
DM16
1321
1326
Power 5
(L/R AMPLIFIER)
1328
DM3
1325
BOARD
TO
BOARD
1261
ab
DC
AMP OFF
LEFT
GND
RIGHT
HST1
SAT
+VH
+VL
GND_L
GND
GND_R
-VL
-VH
DM11
1265
TO FAN
JST JQ
JST VH MALE
JST EH MALE
JST FE MALE
JST PH MALE
DIPMATE
JST XH MALE
BACK ENTRY FEMALE
BACK ENTRY MALE
BOARD IN
CLICK FIT

FRONT BOARD

TABLE OF CONTENTS

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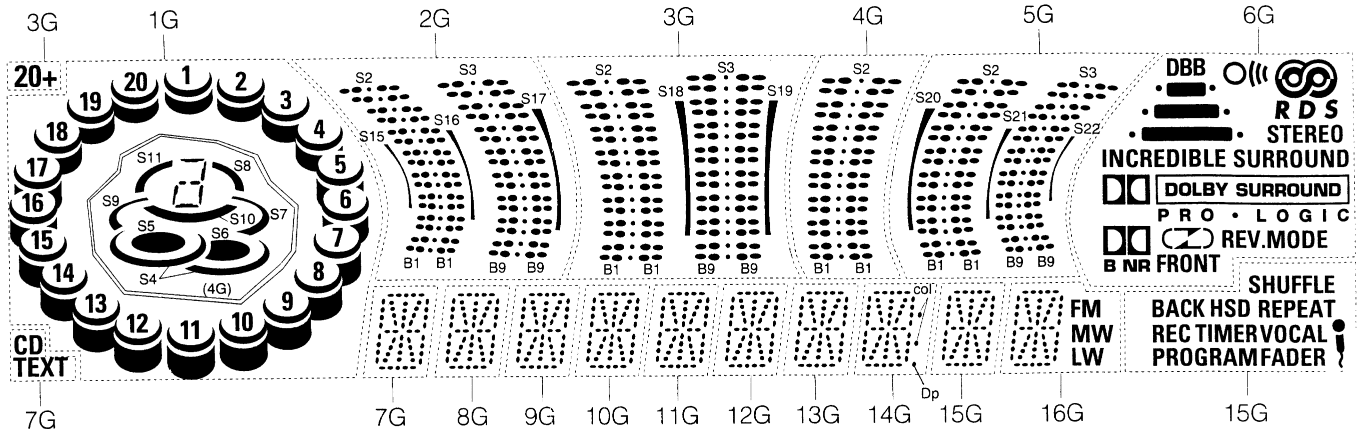
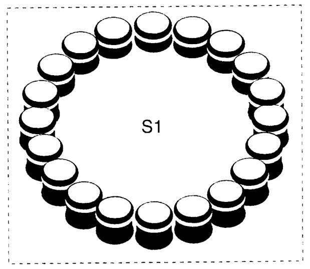
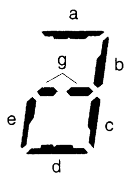
Electrical parts list 6-7

FTD DISPLAY PIN CONNECTIONS

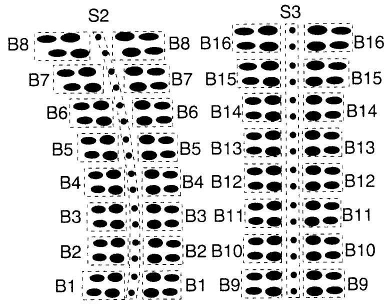

3G
1G
2G
3G
4G
5G
6G
20+
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
S11
S8
S9
S10
S7
S5
S6
S4
(4G)
S2
S3
S15
S16
S17
S18
S19
S20
S21
S22
B1
B9
col
Dp
DBB
RDS
STEREO
INCREDIBLE SURROUND
DOLBY SURROUND
PRO · LOGIC
REV.MODE
B NR FRONT
SHUFFLE
BACK HSD REPEAT
REC TIMER VOCAL
PROGRAM FADER
FM
MW
LW
CD
TEXT
7G
7G
8G
9G
10G
11G
12G
13G
14G
15G
16G
15G



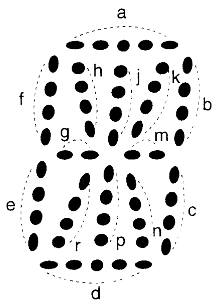
(1G)



(4G)


S2
S3
B8
B7
B6
B5
B4
B3
B2
B1
B16
B15
B14
B13
B12
B11
B10
B9

(2G ~ 5G)


a
h
j
k
f
b
g
m
e
c
r
p
n
d

(7G ~ 16G)

	1G	2G	3G	4G	5G	6G	7G	8G~13G	14G	15G	16G
P1	**1**	B1	B1	B1	B9	**RDS**	a	a	a	a	a
P2	**2**	B9	B9	B2	B1	O(((	h	h	h	h	h
P3	**3**	B2	B2	B3	B10	**DBB**	j , p	j , p	j , p	j , p	j , p
P4	**4**	B10	B10	B4	B2	•▬•	k	k	k	k	k
P5	**5**	B3	B3	B5	B11	•▬▬•	b	b	b	b	b
P6	**6**	B11	B11	B6	B3	•▬▬▬•	f	f	f	f	f
P7	**7**	B4	B4	B7	B12	**STEREO**	m	m	m	m	m
P8	**8**	B12	B12	B8	B4	**INCREDIBLE SURROUND**	g	g	g	g	g
P9	**9**	S2	S2	S2	S3	DD DOLBY SURROUND PRO · LOGIC	c	c	c	c	c
P10	**10**	S15	S18	S4	S20	DD B NR	e	e	e	e	e
P11	**11**	S3	S3	S5	S2	**FRONT**	r	r	r	r	r
P12	**12**	S16	S19	S6	S21	**REV.MODE**	n	n	n	n	n
P13	**13**	S17	**20+**	S7	S22	(	d	d	d	d	d
P14	**14**	B8	B8	B8	B16	)	**CD TEXT**	-	col	**SHUFFLE**	**FM**
P15	**15**	B16	B16	B9	B8	-	-	-	Dp	**REPEAT**	**MW**
P16	**16**	B5	B5	B10	B13	-	-	-	-	**VOCAL FADER**	**LW**
P17	**20**	B13	B13	B11	B5	-	-	-	-	**HSD**	-
P18	**17**	B7	B7	a , g , d	B15	-	-	-	-	**BACK**	-
P19	**18**	B15	B15	e	B7	-	-	-	-	**TIMER**	-
P20	**19**	B6	B6	b	B14	-	-	-	-	**REC**	-
P21	S1	B14	B14	c	B6	-	-	-	-	**PROGRAM**	-

Front Board application

PC Board	Used by:
A87770	FW850C/21/21M, FW855C/21/21M/33
A87790	FW850C/22/34, FW855C/34
A87830	FW860P/21/21M
A87900	FW880P/21/21M/33, FW880W/21/21M
A87920	FW880P/22/34, FW880W/22/34

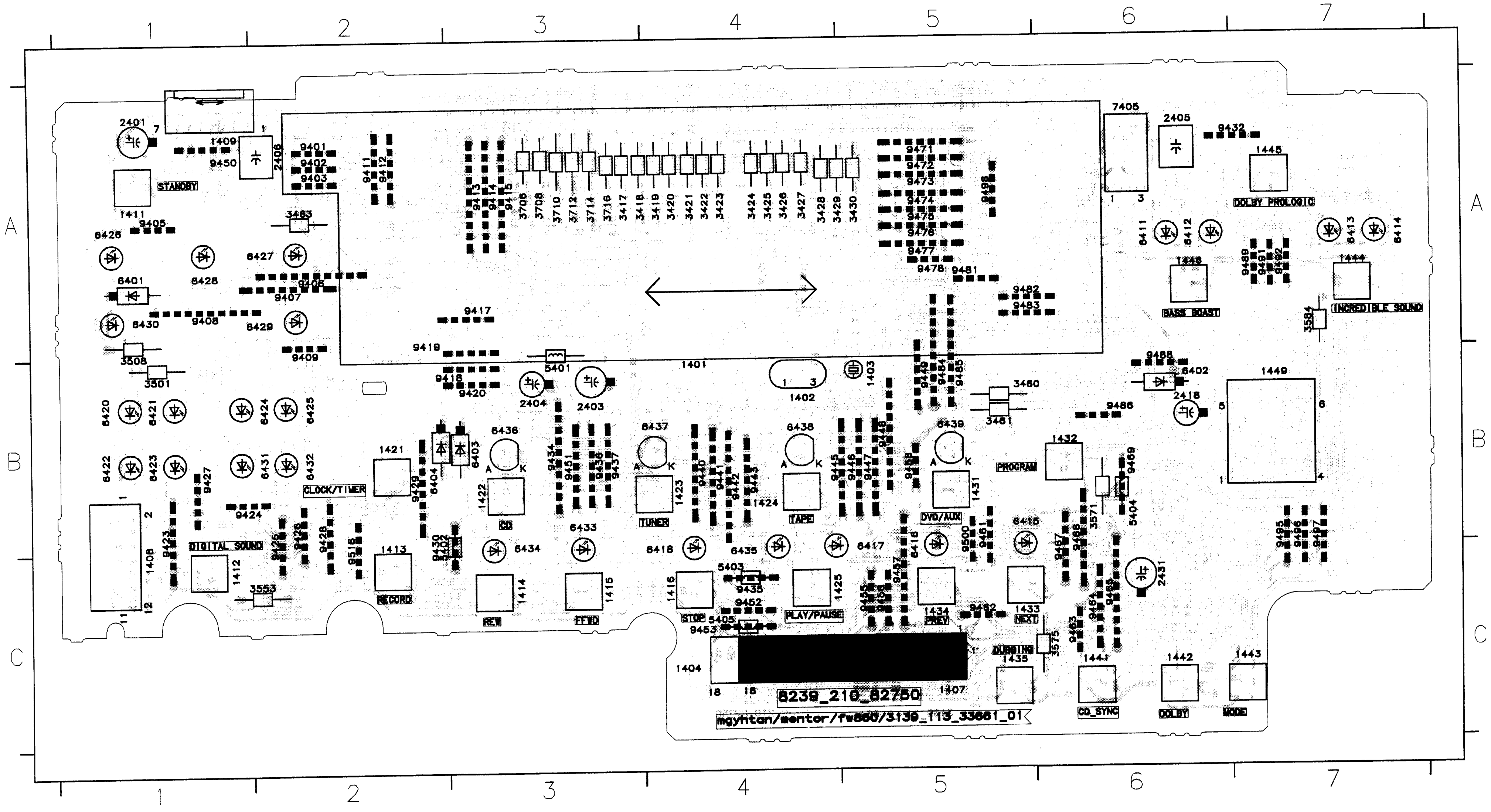
Variations table for Front boards

	A87770	A87790	A87830	A87900	A87920
31	x	-	x	x	-
32	-	x	-	-	x
35	-	-	x	x	x
36	x	-	x	x	-
1404	x	x	-	x	x
1407	-	-	x	-	-
1445	-	-	x	x	x
1451	-	x	x	x	x
1481	-	x	x	x	x
1489	-	x	-	-	x
2418	22u	22u	10u	22u	22u
2476	-	100n	100n	100n	100n
2481	-	100p	-	-	100p
2482	-	47p	-	-	47p
2484	-	100n	-	-	100n
2485	-	82p	-	-	82p
2486	-	47p	-	-	47p
2487, 2488	-	560p	-	-	560p
2489	-	2u2	-	-	2u2
2494	-	-	-	47u	47u
3504 - 3508	-	-	150R	150R	150R
3610	-	-	-	47k	47k
3631	-	1k	-	-	1k
3643, 3644	10k	-	10k	10k	-
3645, 3646	-	10k	-	-	10k
3647	-	2k2	-	-	2k2
3651	-	220k	-	-	220k
3654	-	-	3k3	3k3	3k3
3655	47k	47k	-	-	-
3658	3k3	-	3k3	3k3	-
3659	-	47k	-	-	47k
3660	-	3k3	3k3	3k3	3k3
3661	47k	-	-	-	-
3662	3k3	3k3	-	3k3	3k3
3663	-	-	47k	-	-
4503	-	x	-	-	x
5402 - 5406	2u2	2u2	-	2u2	2u2
5464	-	2u2	-	-	2u2
6426 - 6430	-	-	x	x	x
6464	-	-	-	x	x
7463	-	x	-	-	x
9566	x	x	x	-	-

x = Item in use

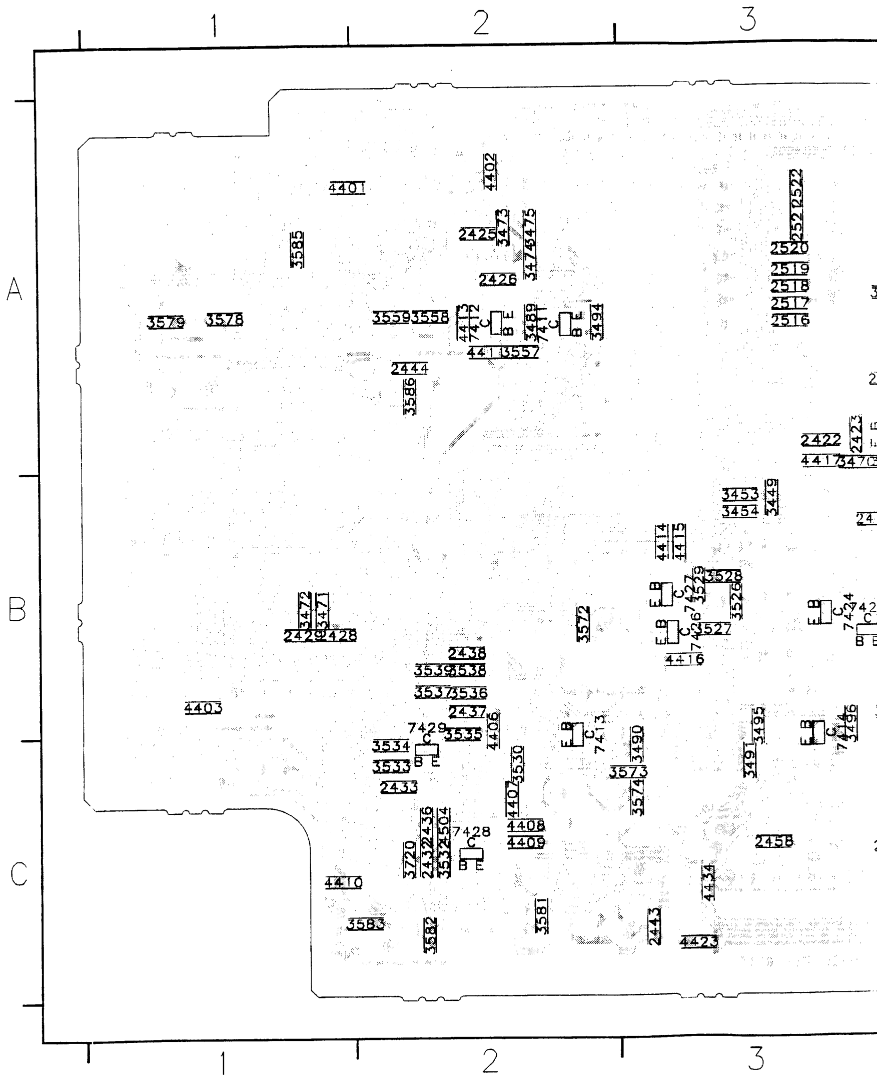
FRONT DISPLAY BOARD - COMPONENT VIEW

1401	B4
1402	B4
1403	B5
1404	C4
1407	C5
1408	C1
1409	A1
1411	A1
1412	C1
1413	B2
1414	C3
1415	C3
1416	C4
1421	B2
1422	B3
1423	B4
1424	B4
1425	C4
1431	B5
1432	B6
1433	C5
1434	C5
1435	C5
1441	C6
1442	C6
1443	C7
1444	A7
1445	A7
1446	A6
1449	B7
2401	A1
2403	B3
2404	B3
2405	A6
2406	A2
2418	B6
2431	C6
3417	A3
3418	A3
3419	A4
3420	A4
3421	A4
3422	A4
3423	A4
3424	A4
3425	A4
3426	A4
3427	A4
3428	A4
3429	A4
3430	A5
3460	B5
3461	B5
3463	A2
3501	B1
3508	A1
3553	C2
3571	B6
3575	C6
3584	A7
3706	A3
3708	A3
3710	A3
3712	A3
3714	A3
3716	A3
5401	B3
5402	B2
5403	C4
5404	B6
5405	C4
6401	A1
6402	B6
6403	B3
6404	B2
6411	A6
6412	A6
6413	A7
6414	A7
6415	B5
6416	B5
6417	C5
6418	C4
6420	B1
6421	B1
6422	B1
6423	B1
6424	B2
6425	B2
6426	A1
6427	A2
6428	A1
6429	A2
6430	A1
6431	B2
6432	B2
6433	B3
6434	B3
6435	C4
6436	B3
6437	B4
6438	B4
6439	B5
7405	A6
9401	A2
9402	A2
9403	A2
9405	A1
9406	A2
9407	A2
9408	A1
9409	A2
9411	A2
9412	A2
9413	A3
9414	A3
9415	A3
9417	A3
9418	B3
9419	A2
9420	B3
9423	B1
9424	B1
9425	B2
9426	B2
9427	B1
9428	B2
9429	B2
9430	B2
9432	A7
9434	B3
9435	C4
9436	B3
9437	B3
9440	B4
9441	B4
9442	B4
9443	B4
9445	B4
9446	B5
9447	B5
9448	B5
9449	B5
9450	A1
9451	B3
9452	C4
9453	C4
9455	C5
9456	C5
9457	C5
9458	B5
9461	B5
9462	C5
9463	C6
9464	C6
9465	C6
9467	C6
9468	B6
9469	B6
9471	A5
9472	A5
9473	A5
9474	A5
9475	A5
9476	A5
9477	A5
9478	A5
9481	A5
9482	A5
9483	A5
9484	B5
9485	B5
9486	B6
9488	B6
9489	A7
9491	A7
9492	A7
9495	B7
9496	B7
9497	B7
9498	A5
9500	B5
9516	B2


1
2
3
4
5
6
7
A
B
C
STANDBY
DOLBY PROLOGIC
BASS BOAST
INCREDIBLE SOUND
CLOCK/TIMER
DIGITAL SOUND
CD
TUNER
TAPE
DVD/AUX
PROGRAM
RECORD
REW
FFWD
STOP
PLAY/PAUSE
PREV
NEXT
DUBBING
CD_SYNC
DOLBY
MODE
8239_210_62750
mgyhton/mentor/fw860/3139_113_33661_01

FRONT DISPLAY BOARD - COPPER SIDE VIEW

2407	A4
2408	B4
2409	B4
2410	B4
2411	B3
2413	B4
2414	B4
2415	B4
2416	B4
2417	B4
2421	B4
2422	A3
2423	A3
2425	A2
2426	A2
2428	B1
2429	B1
2432	C2
2433	C2
2436	C2
2437	B2
2438	B2
2441	C4
2442	C4
2443	C3
2444	A2
2445	A6
2446	B7
2447	B7
2448	A6
2449	A6
2451	A5
2452	A5
2453	A5
2454	A5
2455	A5
2456	A5
2457	C4
2458	C3
2459	A4
2460	A5
2464	C4
2513	A5
2514	A5
2515	A6
2516	A3
2517	A3
2518	A3
2519	A3
2520	A3
2521	A3
2522	A3
3401	A5
3402	A5
3403	A5
3404	A5
3405	A5
3406	A5
3407	A5
3408	A5
3409	A5
3410	A5
3411	A5
3412	A5
3413	A5
3414	A5
3415	A5
3416	A4
3431	A4
3432	A4
3433	A4
3434	A4
3435	A4
3436	A4
3437	A4
3439	A4
3440	A4
3441	A6
3442	A6
3443	A6
3445	A4
3446	A4
3449	B3
3453	B3
3454	B3
3455	B4
3456	B4
3457	B4
3458	B4
3462	B5
3466	B5
3468	B5
3470	A3
3471	B1
3472	B1
3473	A2
3474	A2
3475	A2
3476	C4
3477	A4
3478	A4
3479	A4
3489	A2
3490	C3
3491	C3
3492	C4
3493	C4
3494	A2
3495	B3
3496	B3
3497	B4
3502	B7

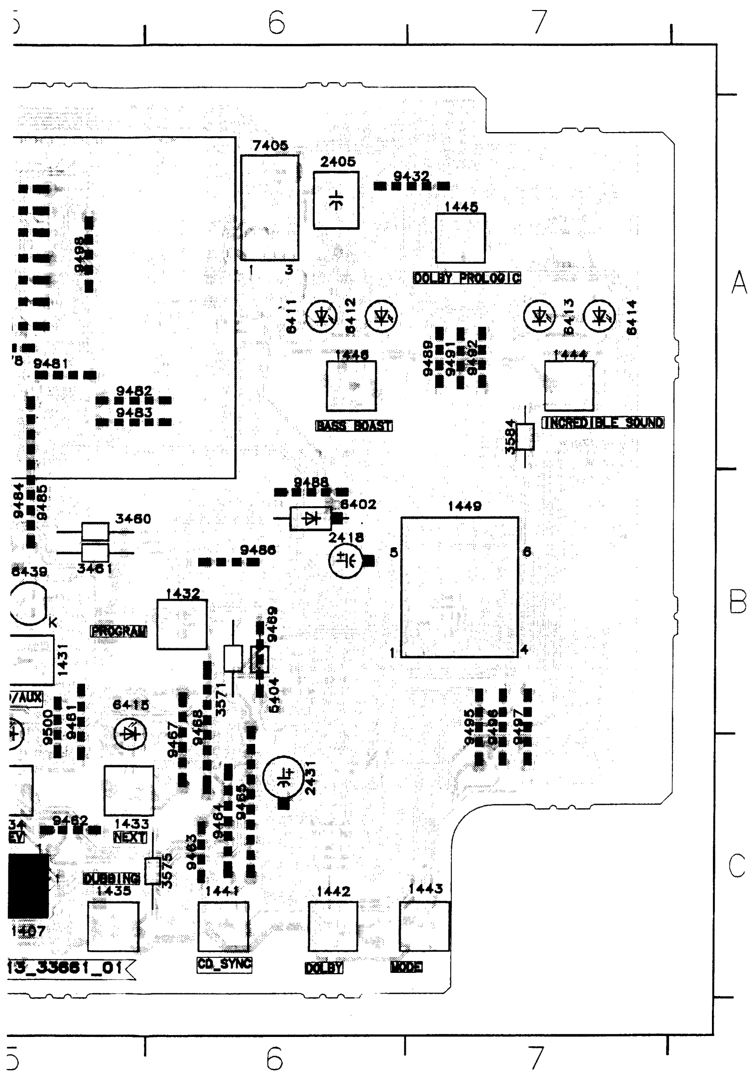


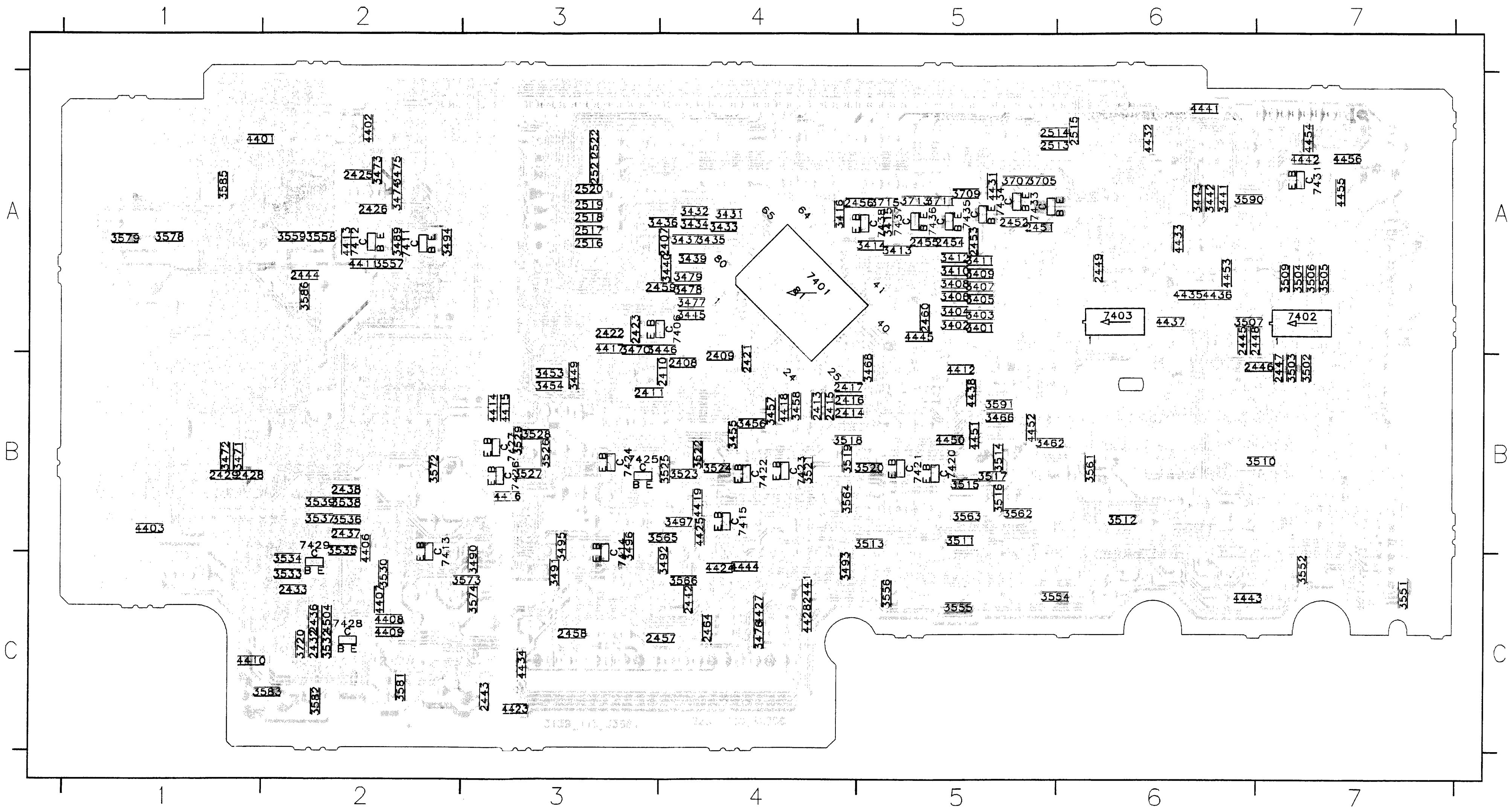
FRONT DISPLAY BOARD - COPPER SIDE VIEW

9420	B3	9434	B3	9447	B5	9458	B5	9472	A5	9484	B5	9498	A5
9423	B1	9435	C4	9448	B5	9461	B5	9473	A5	9485	B5	9500	B5
9424	B1	9436	B3	9449	B5	9462	C5	9474	A5	9486	B6	9516	B2
9425	B2	9437	B3	9450	A1	9463	C6	9475	A5	9488	B6		
9426	B2	9440	B4	9451	B3	9464	C6	9476	A5	9489	A7		
9427	B1	9441	B4	9452	C4	9465	C6	9477	A5	9491	A7		
9428	B2	9442	B4	9453	C4	9467	C6	9478	A5	9492	A7		
9429	B2	9443	B4	9455	C5	9468	B6	9481	A5	9495	B7		
9430	B2	9445	B4	9456	C5	9469	B6	9482	A5	9496	B7		
9432	A7	9446	B5	9457	C5	9471	A5	9483	A5	9497	B7		

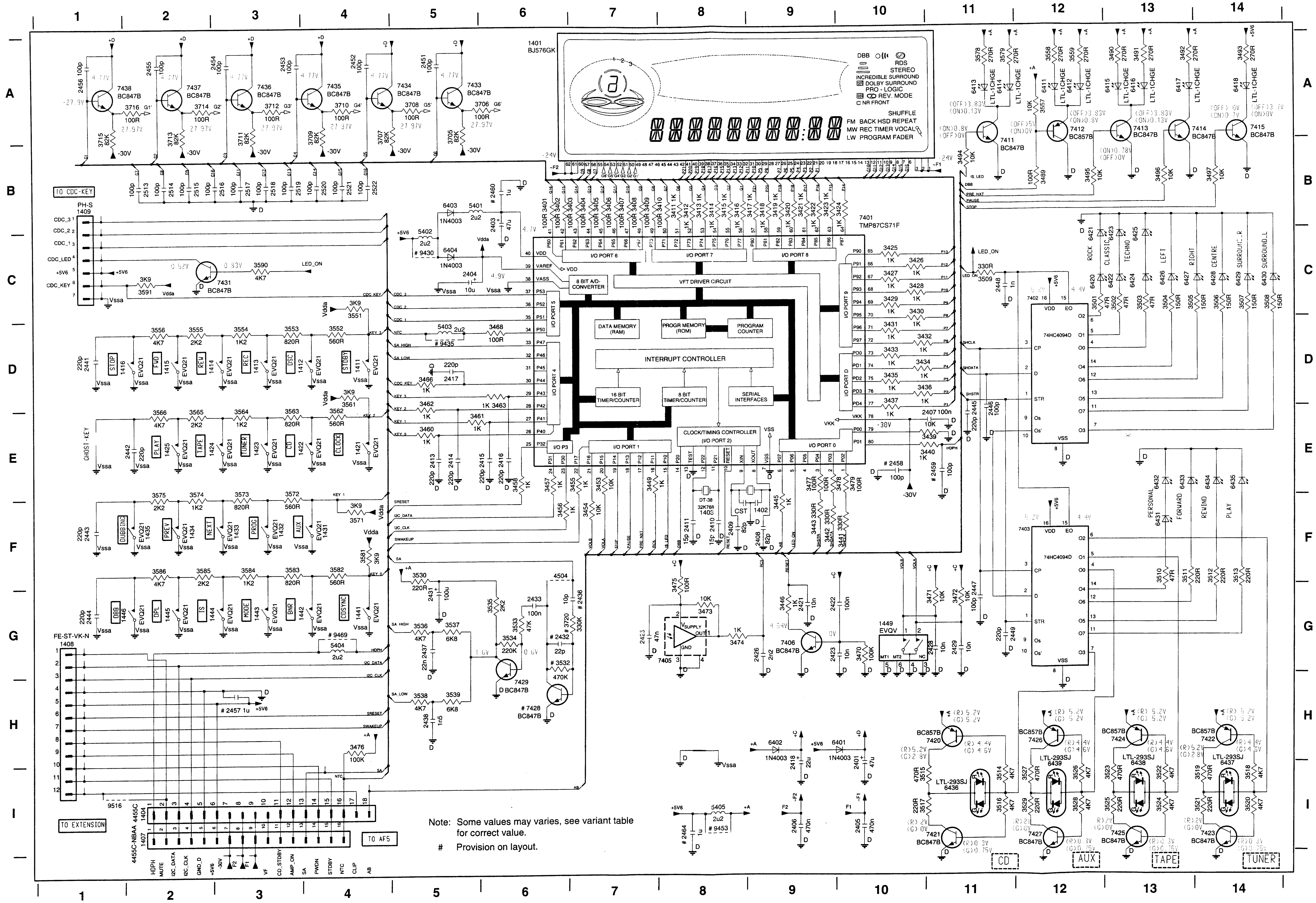
2407	A4	2426	A2	2447	B7	2513	A5	3405	A5	3433	A4	3454	B3	3476	C4	3503	B7
2408	B4	2428	B1	2448	A6	2514	A5	3406	A5	3434	A4	3455	B4	3477	A4	3504	A7
2409	B4	2429	B1	2449	A6	2515	A6	3407	A5	3435	A4	3456	B4	3478	A4	3505	A7
2410	B4	2432	C2	2451	A5	2516	A3	3408	A5	3436	A4	3457	B4	3479	A4	3506	A7
2411	B3	2433	C2	2452	A5	2517	A3	3409	A5	3437	A4	3458	B4	3489	A2	3507	A6
2413	B4	2436	C2	2453	A5	2518	A3	3410	A5	3439	A4	3462	B5	3490	C3	3509	A7
2414	B4	2437	B2	2454	A5	2519	A3	3411	A5	3440	A4	3466	B5	3491	C3	3510	B7
2415	B4	2438	B2	2455	A5	2520	A3	3412	A5	3441	A6	3468	B5	3492	C4	3511	B5
2416	B4	2441	C4	2456	A5	2521	A3	3413	A5	3442	A6	3470	A3	3493	C4	3512	B6
2417	B4	2442	C4	2457	C4	2522	A3	3414	A5	3443	A6	3471	B1	3494	A2	3513	B5
2421	B4	2443	C3	2458	C3	3401	A5	3415	A5	3445	A4	3472	B1	3495	B3	3514	B5
2422	A3	2444	A2	2459	A4	3402	A5	3416	A4	3446	A4	3473	A2	3496	B3	3515	B5
2423	A3	2445	A6	2460	A5	3403	A5	3431	A4	3449	B3	3474	A2	3497	B4	3516	B5
2425	A2	2446	B7	2464	C4	3404	A5	3432	A4	3453	B3	3475	A2	3502	B7	3517	B5

3518	B4	3533	C2	3559	A2	3583	C2	4403	B1	4419	B4	4441	A6	7402	A7	7426	B3
3519	B4	3534	C2	3561	B6	3585	A1	4406	B2	4423	C3	4442	A7	7403	A6	7427	B3
3520	B5	3535	B2	3562	B5	3586	A2	4407	C2	4424	C4	4443	C6	7406	A4	7428	C2
3521	B4	3536	B2	3563	B5	3590	A6	4408	C2	4425	B4	4444	C4	7411	A2	7429	B2
3522	B4	3537	B2	3564	B4	3591	B5	4409	C2	4427	C4	4445	A5	7412	A2	7431	A7
3523	B4	3538	B2	3565	B4	3705	A5	4410	C1	4428	C4	4450	B5	7413	B2	7433	A5
3524	B4	3539	B2	3566	C4	3707	A5	4411	A2	4431	A5	4451	B5	7414	C3	7434	A5
3525	B4	3551	C7	3572	B2	3709	A5	4412	B5	4432	A6	4452	B5	7415	B4	7435	A5
3526	B3	3552	C7	3573	C3	3711	A5	4413	A2	4433	A6	4453	A6	7420	B5	7436	A5
3527	B3	3554	C5	3574	C3	3713	A5	4414	B3	4434	C3	4454	A7	7421	B5	7437	A5
3528	B3	3555	C5	3578	A1	3715	A5	4415	B3	4435	A6	4455	A7	7422	B4	7438	A5
3529	B3	3556	C5	3579	A1	3720	C2	4416	B3	4436	A6	4456	A7	7423	B4		
3530	C2	3557	A2	3581	C2	4401	A1	4417	A3	4437	A6	4504	C2	7424	B3		
3532	C2	3558	A2	3582	C2	4402	A2	4418	B4	4438	B5	7401	A4	7425	B3		





CIRCUIT DIAGRAM - FRONT DISPLAY PART

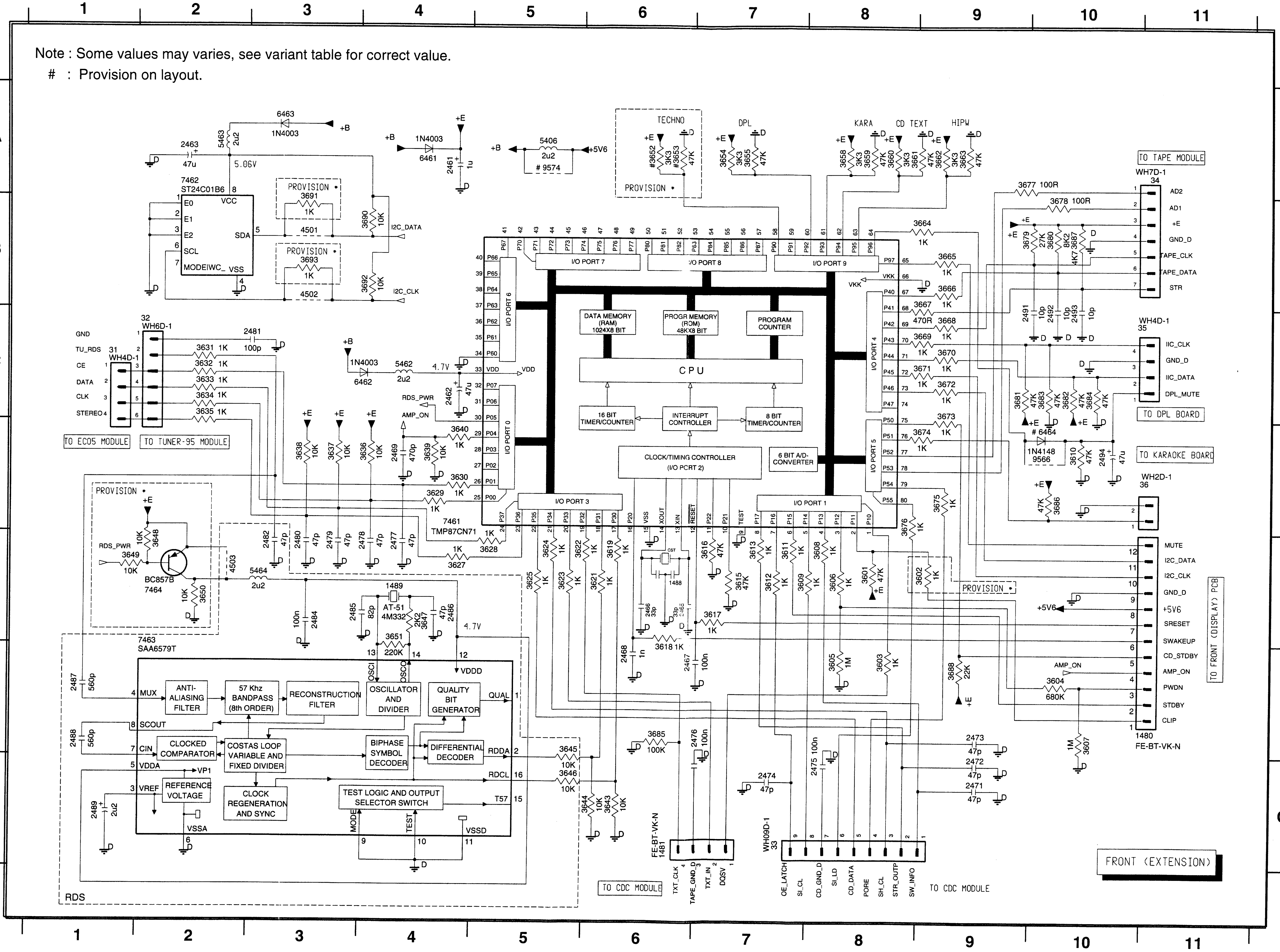

1401
BJ576GK
DBB
RDS
STEREO
INCREDIBLE SURROUND
DOLBY SURROUND
PRO - LOGIC
REV. MODE
NR FRONT
SHUFFLE
FM BACK HSD REPEAT
MW REC TIMER VOCAL
LW PROGRAM FADER
7401
TMP87CS71F
I/O PORT 6
I/O PORT 7
I/O PORT 8
I/O PORT 9
I/O PORT D
I/O PORT 5
I/O PORT 4
I/O PORT 3
I/O PORT 1
I/O PORT 0
8 BIT A/D-CONVERTER
VFT DRIVER CIRCUIT
DATA MEMORY (RAM)
PROGR MEMORY (ROM)
PROGRAM COUNTER
INTERRUPT CONTROLLER
16 BIT TIMER/COUNTER
8 BIT TIMER/COUNTER
SERIAL INTERFACES
CLOCK/TIMING CONTROLLER (I/O PORT 2)
TO CDC-KEY
PH-S
1409
CDC_3
CDC_2
CDC_1
CDC_LED
+5V6
CDC_KEY
7431
BC847B
LED_ON
STOP
FWD
REW
REC
DSC
STDBY
GHOST-KEY
PLAY
TAPE
TUNER
CD
CLOCK
DUBBING
PREV
NEXT
PROG
AUX
DBB
DPL
IS
MODE
BNR
CDSYNC
EVQ21
Vssa
Vdda
FE-ST-VK-N
1408
TO EXTENSION
9516
4455C-NBAA 4455C
1404
1407
TO AF5
HDPH
MUTE
I2C_DATA
I2C_CLK
GND_D
+5V6
-30V
F2
F1
VF
CD_STDBY
AMP_ON
SA
PWDN
STDBY
NTC
CLIP
AB
7438
7437
7436
7435
7434
7433
BC847B
7428
7429
7405
7406
1449
EVQV
7402
7403
74HC4094D
7411
7412
7413
7414
7415
BC857B
LTL-1CHGE
ROCK
CLASSIC
TECHNO
LEFT
RIGHT
CENTRE
SURROUND_R
SURROUND_L
PERSONAL
FORWARD
REWIND
PLAY
7420
7421
7422
7423
7424
7425
7426
7427
LTL-293SJ
6436
6437
6438
6439
CD
AUX
TAPE
TUNER
1 2 3 4 5 6 7 8 9 10 11 12 13 14
A B C D E F G H I

Note: Some values may varies, see variant table for correct value.

# Provision on layout.

1401	A6
1402	F9
1403	F8
1404	I2
1407	I2
1408	G1
1409	B1
1411	D4
1412	D3
1413	D3
1414	D2
1415	D2
1416	D1
1421	E4
1422	E3
1423	E3
1424	E2
1425	E2
1431	F4
1432	F3
1433	F3
1434	F2
1435	F2
1441	G4
1442	G3
1443	G3
1444	G2
1445	G2
1446	G1
1449	G10
2401	I10
2403	B6
2404	C5
2405	I10
2406	I9
2407	E11
2408	F9
2409	F8
2410	F8
2411	F8
2413	E5
2414	E5
2415	E6
2416	E6
2417	D5
2418	I9
2421	G9
2422	G9
2423	G9
2425	G7
2426	G9
2428	G11
2429	G11
2431	G5
2432	G6
2433	G6
2436	G7
2437	G5
2438	H5
2441	D1
2442	E2
2443	F1
2444	G1
2445	E11
2446	E11
2447	G11
2448	C11
2449	G11
2451	A5
2452	A4
2453	A3
2454	A2
2455	A2
2456	A1
2457	H3
2458	E10
2459	E11
2460	B6
2464	I8
2513	B2
2514	B2
2515	B2
2516	B3
2517	B3
2518	B3
2519	B3
2520	B4
2521	B4
2522	B4
3401	B6
3402	B6
3403	B6
3404	B7
3405	B7
3406	B7
3407	B7
3408	B7
3409	B7
3410	B7
3411	B8
3412	B8
3413	B8
3414	B8
3415	B8
3416	B8
3417	B9
3418	B9
3419	B9
3420	B9
3421	B9
3422	B9
3423	B9
3424	B10
3425	C10
3426	C10
3427	C10
3428	C10
3429	C10
3430	C10
3431	D10
3432	D10
3433	D10
3434	D10
3435	D10
3436	D10
3437	D10
3439	E11
3440	E11
3441	F10
3442	F9
3443	F9
3445	F9
3446	G9
3449	E7
3453	E7
3454	F7
3455	E7
3456	F6
3457	E6
3458	E6
3460	E5
3461	E5
3462	D5
3463	D6
3466	D5
3468	D6
3470	G10
3471	G11
3472	G11
3473	G8
3474	G8
3475	G8
3476	H4
3477	E9
3478	E9
3479	E10
3489	B12
3490	A13
3491	A13
3492	A13
3493	A14
3494	B11
3495	B12
3496	B13
3497	B14
3501	C12
3502	C13
3503	C13
3504	C13
3505	C13
3506	C14
3507	C14
3508	C14
3509	C11
3510	F13
3511	F13
3512	F14
3513	F14
3514	I11
3515	I10
3516	I11
3517	I10
3518	I14
3519	I14
3520	I14
3521	I14
3522	I13
3523	I13
3524	I13
3525	I13
3526	I12
3527	I12
3528	I12
3529	I12
3530	F5
3532	G6
3533	G6
3534	G6
3535	G6
3536	G5
3537	G5
3538	H5
3539	H5
3551	C4
3552	D4
3553	D3
3554	D3
3555	D2
3556	D2
3557	A12
3558	A12
3559	A12
3561	D4
3562	E4
3563	E3
3564	E3
3565	E2
3566	E2
3571	F4
3572	E3
3573	E3
3574	E2
3575	E2
3578	A11
3579	A11
3581	F4
3582	F4
3583	F3
3584	F3
3585	F2
3586	F2
3590	C3
3591	C2
3705	A5
3706	A6
3707	A4
3708	A5
3709	A4
3710	A4
3711	A3
3712	A3
3713	A2
3714	A2
3715	A1
3716	A2
3720	G6
4504	F6
5401	B5
5402	C5
5403	D5
5404	G4
5405	I8
6401	H10
6402	H9
6403	B5
6404	C5
6411	A12
6412	A12
6413	A11
6414	A11
6415	A13
6416	A13
6417	A13
6418	A14
6420	C12
6421	C12
6422	C13
6423	C13
6424	C13
6425	C13
6426	C13
6427	C13
6428	C14
6429	C14
6430	C14
6431	F13
6432	E13
6433	E13
6434	E14
6435	E14
6436	I11
6437	I14
6438	I13
6439	I12
7401	B10
7402	C12
7403	F12
7405	G8
7406	G9
7411	B11
7412	A12
7413	A13
7414	A13
7415	A14
7420	H11
7421	I11
7422	H14
7423	I14
7424	H13
7425	I13
7426	H12
7427	I12
7428	H6
7429	H6
7431	C3
7433	A5
7434	A5
7435	A4
7436	A3
7437	A2
7438	A1
9430	C5
9435	D5
9453	I8
9469	G4
9516	I1

CIRCUIT DIAGRAM - SANDWICH PART

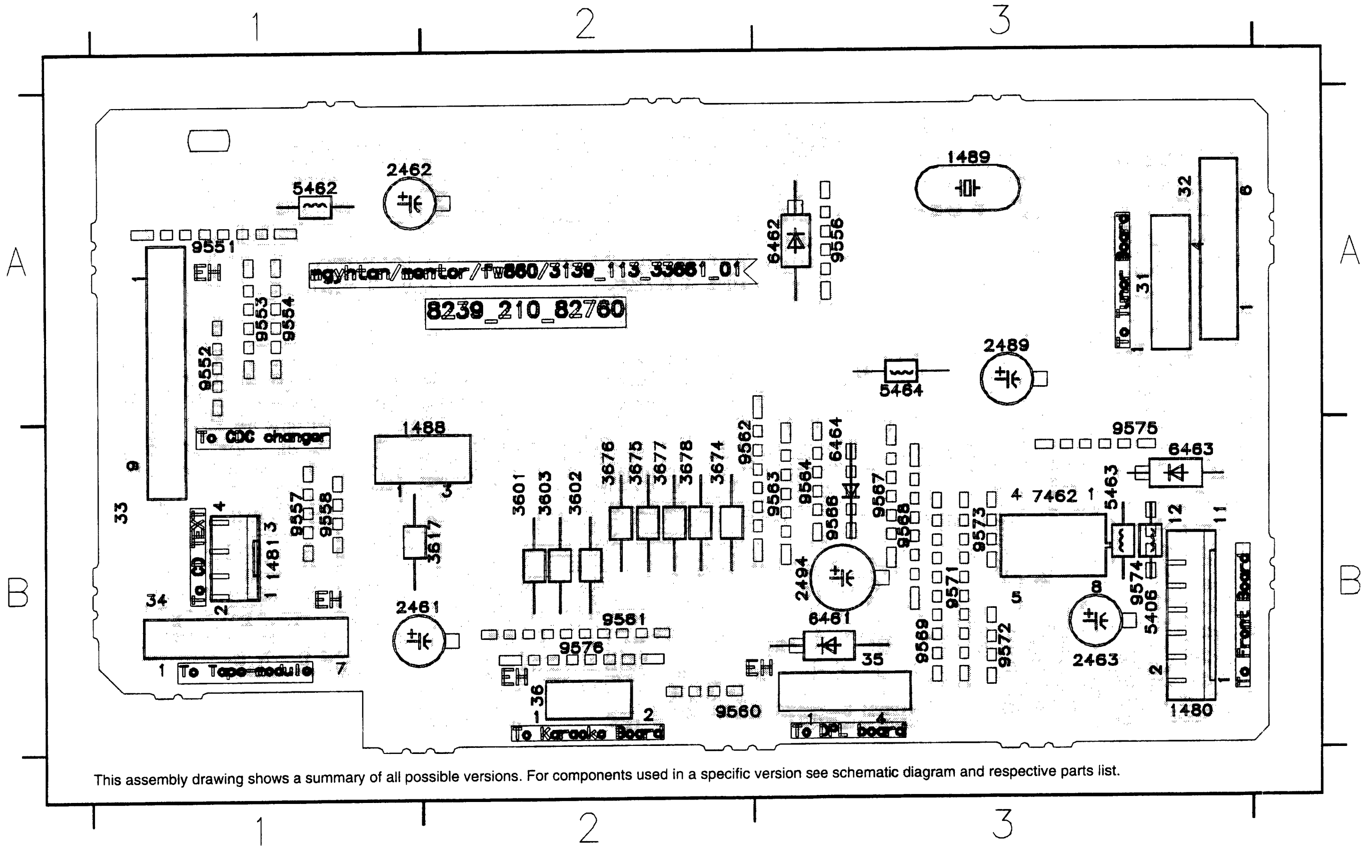

Note : Some values may varies, see variant table for correct value.
# : Provision on layout.

1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
7462
ST24C01B6
E0
E1
E2
SCL
MODEIWC_
VCC
SDA
VSS
6463
1N4003
+B
5463
2u2
2463
47u
5.06V
PROVISION •
3691
1K
4501
3693
1K
4502
3690
10K
3692
10K
I2C_DATA
I2C_CLK
+E
1N4003
6461
2461
1u
5406
2u2
# 9574
+5V6
TECHNO
#3652
3K3
#3653
47K
PROVISION •
DPL
3654
3K3
3655
47K
KARA
CD TEXT
HIPW
3658
3K3
3659
47K
3660
3K3
3661
47K
3662
3K3
3663
47K
TO TAPE MODULE
WH7D-1
34
3677 100R
3678 100R
AD2
AD1
+E
GND_D
TAPE_CLK
TAPE_DATA
STR
3679
27K
3680
8K2
3687
4K7
2491
10p
2492
10p
2493
10p
WH4D-1
35
IIC_CLK
GND_D
IIC_DATA
DPL_MUTE
TO DPL BOARD
3681
47K
3683
47K
3682
47K
3684
47K
# 6464
1N4148
9566
3610
47K
2494
47u
TO KARAOKE BOARD
WH2D-1
36
3686
47K
GND
TU_RDS
CE
DATA
CLK
STEREO
31
WH4D-1
32
WH6D-1
2481
100p
3631 1K
3632 1K
3633 1K
3634 1K
3635 1K
TO ECO5 MODULE
TO TUNER-95 MODULE
1N4003
6462
5462
2u2
4.7V
2462
47u
VDD
RDS_PWR
AMP_ON
3640
1K
3630
1K
3629
1K
3638
10K
3637
10K
3636
10K
2469
470p
3639
10K
I/O PORT 6
I/O PORT 0
I/O PORT 7
I/O PORT 8
I/O PORT 9
I/O PORT 4
I/O PORT 5
I/O PORT 3
I/O PORT 1
DATA MEMORY (RAM) 1024X8 BIT
PROGR MEMORY (ROM) 48KX8 BIT
PROGRAM COUNTER
CPU
16 BIT TIMER/COUNTER
INTERRUPT CONTROLLER
8 BIT TIMER/COUNTER
CLOCK/TIMING CONTROLLER (I/O PORT 2)
6 BIT A/D-CONVERTER
7461
TMP87CN71
VKK
3664
1K
3665
1K
3666
1K
3667 1K
470R
3668
1K
3669 1K
3670
1K
3671 1K
3672
1K
3673
1K
3674 1K
3675
1K
3676
1K
3628
1K
3627
1K
PROVISION •
RDS_PWR
3649
10K
3648
10K
BC857B
7464
3650
10K
4503
5464
2u2
2482
47p
2480
47p
2479
47p
2478
47p
2477
47p
2484
100n
1489
AT-51
4M332
2485
82p
3647
2K2
2486
47p
3651
220K
4.7V
3625
1K
3624
1K
3623
1K
3622
1K
3621
1K
3619
1K
2466
33p
2465
33p
1488
3616
47K
3615
47K
3617
1K
3618 1K
2468
1n
2467
100n
3613
1K
3612
1K
3611
1K
3609
1K
3608
1K
3606
1K
3601
47K
3602
1K
PROVISION •
3605
1M
3603
1K
3688
22K
AMP_ON
3604
680K
3607
1M
+5V6
MUTE
I2C_DATA
I2C_CLK
GND_D
+5V6
SRESET
SWAKEUP
CD_STDBY
AMP_ON
PWDN
STDBY
CLIP
1480
FE-BT-VK-N
TO FRONT (DISPLAY) PCB
7463
SAA6579T
MUX
ANTI-ALIASING FILTER
57 Khz BANDPASS (8th ORDER)
RECONSTRUCTION FILTER
OSCILLATOR AND DIVIDER
QUALITY BIT GENERATOR
QUAL
SCOUT
CIN
CLOCKED COMPARATOR
COSTAS LOOP VARIABLE AND FIXED DIVIDER
BIPHASE SYMBOL DECODER
DIFFERENTIAL DECODER
RDDA
VDDA
VP1
RDCL
VREF
REFERENCE VOLTAGE
CLOCK REGENERATION AND SYNC
TEST LOGIC AND OUTPUT SELECTOR SWITCH
T57
VSSA
MODE
TEST
VSSD
OSCI
OSCO
VDDD
2487
560p
2488
560p
2489
2u2
3645
10K
3646
10K
3644
10K
3643
10K
3685
100K
2476
100n
2475 100n
2474
47p
2473
47p
2472
47p
2471
47p
RDS
FE-BT-VK-N
1481
TXT_CLK
TAPE_GND_D
TXT_IN
DQSV
TO CDC MODULE
WH09D-1
33
OE_LATCH
SI_CL
CD_GND_D
SI_LD
CD_DATA
PORE
SH_CL
STR_OUTP
SW_INFO
TO CDC MODULE
FRONT (EXTENSION)

31	C1
32	C2
33	G7
34	A11
35	C10
36	D10
1480	F10
1481	G6
1488	E6
1489	E4
2461	A4
2462	C4
2463	A2
2465	E6
2466	E6
2467	F6
2468	F6
2469	D4
2471	G9
2472	G9
2473	F9
2474	G7
2475	G8
2476	F7
2477	E4
2478	E4
2479	E3
2480	E3
2481	C3
2482	E3
2484	E3
2485	E3
2486	E4
2487	F1
2488	F1
2489	G1
2491	C9
2492	C10
2493	C10
2494	D10
3601	E8
3602	E9
3603	F8
3604	F10
3605	F8
3606	E8
3607	F10
3608	E8
3609	E7
3610	D10
3611	E7
3612	E7
3613	E7
3615	E7
3616	E7
3617	E7
3618	E6
3619	E6
3621	E6
3622	E5
3623	E5
3624	E5
3625	E5
3627	E4
3628	E5
3629	D4
3630	D4
3631	C2
3632	C2
3633	C2
3634	C2
3635	C2
3636	D4
3637	D3
3638	D3
3639	D4
3640	D4
3643	G6
3644	G6
3645	F5
3646	G5
3647	E4
3648	E2
3649	E1
3650	E2
3651	E4
3652	A6
3653	A6
3654	A7
3655	A7
3658	A8
3659	A8
3660	A8
3661	A8
3662	A9
3663	A9
3664	B9
3665	B9
3666	B9
3667	B9
3668	C9
3669	C9
3670	C9
3671	C9
3672	C9
3673	C9
3674	D9
3675	D9
3676	D8
3677	A9
3678	B10
3679	B9
3680	B10
3681	C9
3682	C10
3683	C10
3684	C10
3685	F6
3686	D10
3687	B10
3688	F9
3690	B4
3691	B3
3692	B4
3693	B3
4501	B3
4502	B3
4503	E2
5406	A5
5462	C4
5463	A2
5464	E3
6461	A4
6462	C4
6463	A3
6464	D10
7461	D4
7462	A2
7463	F2
7464	E2
9566	D10
9574	A5

SANDWICH BOARD - COMPONENT VIEW

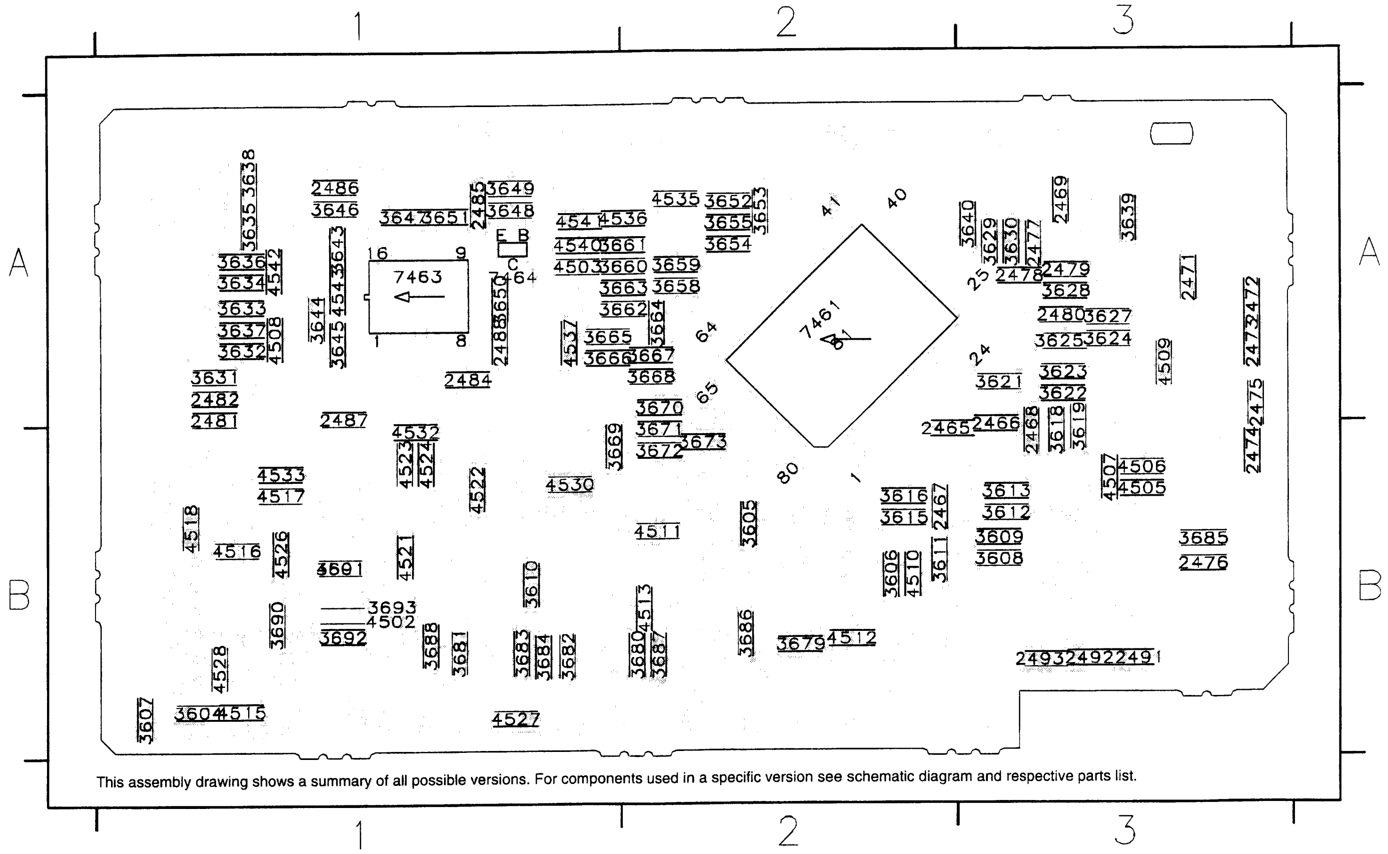
31	A3	1480	B3	2463	B3	3674	B2	5463	B3	9551	A1	9558	B1	9566	B3	9573	B3
32	A3	1481	B1	2489	A3	3675	B2	5464	A3	9552	A1	9560	B2	9567	B3	9574	B3
33	B1	1488	B1	3601	B2	3676	B2	6461	B3	9553	A1	9561	B2	9568	B3	9575	A3
34	B1	1489	A3	3602	B2	3677	B2	6462	A3	9554	A1	9562	B3	9569	B3	9576	B2
35	B3	2461	B1	3603	B2	3678	B2	6463	B3	9556	A3	9563	B3	9571	B3		
36	B2	2462	A1	3617	B2	5462	A1	7462	B3	9557	B1	9564	B3	9572	B3		


1
2
3
A
B
mgyhtan/mentor/fs860/3139_113_33661_01
8239_210_82760
To CDC changer
To CD TEXT
To Tape-module
To Karaoke Board
To DPL board
To Front Board
To Tuner Board
EH
1489
1488
1480
2462
2461
2463
2489
2494
5462
5463
5464
7462
9551
9560
9561
9575
9576
6461
6462
6463

This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

SANDWICH BOARD - COPPER SIDE VIEW

2465	B2	2480	A3	3607	B1	3625	A3	3640	A3	3656	A2	3670	A2	3690	B1	4512	B2	4533	B1
2466	B3	2481	A1	3608	B3	3627	A3	3643	A1	3657	A2	3671	B2	3691	B1	4515	B1	4535	A2
2467	B2	2482	A1	3609	B3	3628	A3	3644	A1	3658	A2	3672	B2	3692	B1	4516	B1	4536	A2
2468	B3	2484	A1	3611	B2	3629	A3	3645	A1	3659	A2	3673	B2	3693	B1	4517	B1	4537	A1
2469	A3	2485	A1	3612	B3	3630	A3	3646	A1	3660	A2	3679	B2	4501	B1	4518	B1	4540	A1
2471	A3	2486	A1	3613	B3	3631	A1	3647	A1	3661	A2	3680	B2	4502	B1	4521	B1	4541	A1
2472	A3	2487	A1	3615	B2	3632	A1	3648	A1	3662	A2	3681	B1	4503	A1	4522	B1	4542	A1
2473	A3	2488	A1	3616	B2	3633	A1	3649	A1	3663	A2	3682	B1	4505	B3	4523	B1	4543	A1
2474	B3	2491	B3	3618	B3	3634	A1	3650	A1	3664	A2	3683	B1	4506	B3	4524	B1	7461	A2
2475	A3	2492	B3	3619	B3	3635	A1	3651	A1	3665	A1	3684	B1	4507	B3	4526	B1	7463	A1
2476	B3	2493	B3	3621	A3	3636	A1	3652	A2	3666	A1	3685	B3	4508	A1	4527	B1	7464	A1
2477	A3	3604	B1	3622	A3	3637	A1	3653	A2	3667	A2	3686	B2	4509	A3	4528	B1		
2478	A3	3605	B2	3623	A3	3638	A1	3654	A2	3668	A2	3687	B2	4510	B2	4530	B1		
2479	A3	3606	B2	3624	A3	3639	A3	3655	A2	3669	B1	3688	B1	4511	B2	4532	B1		

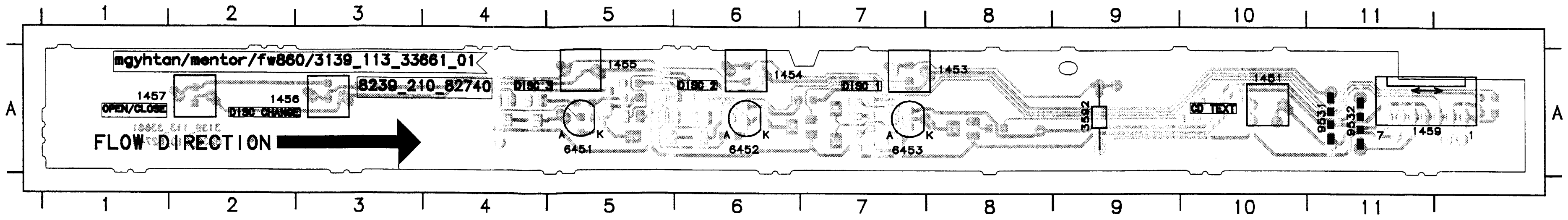

1
2
3
A
B
7463
7461
2486
3646
3631
2482
2481
2484
2487
4533
4517
4516
4518
4527
3607
3685
2476
2471
4509
2465
2466
3621
3623
3622

This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

KEY-CDC PART

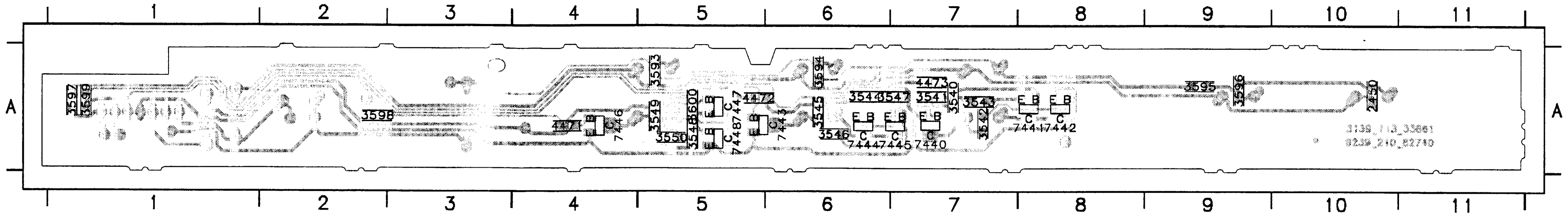
KEY-CDC BOARD - COMPONENT LAYOUT

1451 A10	1453 A8	1454 A6	1455 A5	1456 A2	1457 A1	1459 A11	3592 A9	6451 A5	6452 A6	6453 A7	9531 A11	9532 A11	


1
2
3
4
5
6
7
8
9
10
11
A
mgyhtan/mentor/fw860/3139_113_33661_01
8239_210_82740
1457
OPEN/CLOSE
1456
DISC CHANGE
FLOW DIRECTION
DISC 3
1455
6451
DISC 2
1454
6452
DISC 1
1453
6453
3592
CD TEXT
1451
9531
9532
1459

KEY-CDC BOARD - COPPER SIDE VIEW

2450 A10	3541 A7	3543 A7	3545 A6	3547 A7	3549 A5	3593 A5	3595 A9	3597 A1	3599 A1	4471 A4	4473 A7	7441 A8	7443 A6	7445 A7	7447 A5
3540 A7	3542 A7	3544 A6	3546 A6	3548 A5	3550 A5	3594 A6	3596 A9	3598 A2	3600 A5	4472 A5	7440 A7	7442 A8	7444 A6	7446 A4	7448 A5


1
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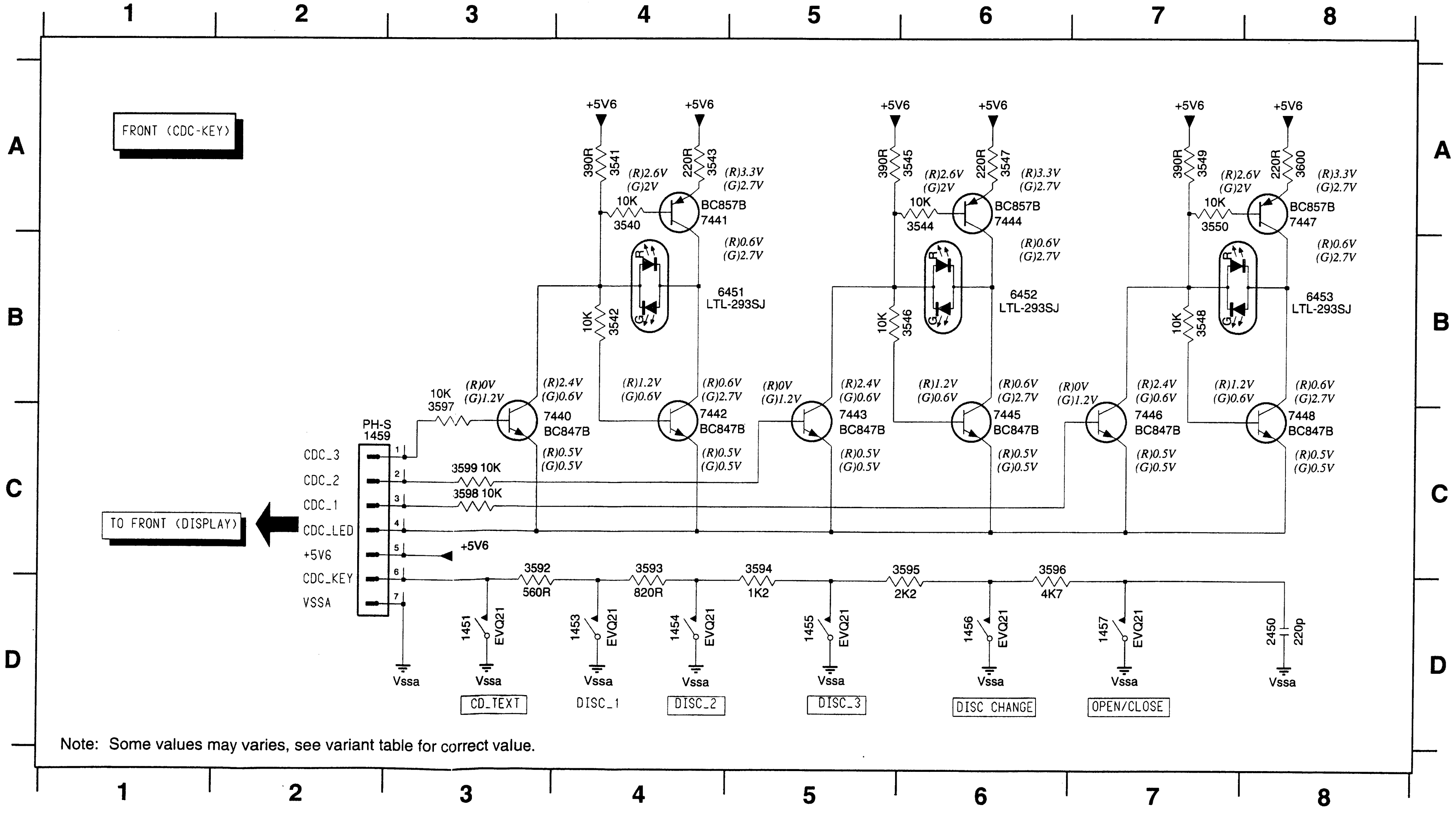
3
4
5
6
7
8
9
10
11
A
3597
3599
3598
4471
3593
3550
3594
4472
3545
3544
3547
4473
3541
3540
3543
3546
7440
7442
3595
3596
2450
3139_113_33661
8239_210_82740

CIRCUIT DIAGRAM - KEY-CDC PART

1451 D3	1454 D4	1456 D6	1459 C3	3540 A4	3542 B4	3544 A6	3546 B6	3548 B7	3550 A7	3593 C4	3595 C6	3597 C3	3599 C3	6451 B5	6453 B8	7441 A4	7443 C5	7445 C6	7447 A8
1453 D4	1455 D5	1457 D7	2450 D8	3541 A4	3543 A4	3545 A6	3547 A6	3549 A7	3592 C3	3594 C5	3596 C6	3598 C3	3600 A8	6452 B6	7440 C3	7442 C4	7444 A6	7446 C7	7448 C8


1
2
3
4
5
6
7
8
A
B
C
D
FRONT (CDC-KEY)
TO FRONT (DISPLAY)
PH-S
1459
CDC_3
CDC_2
CDC_1
CDC_LED
+5V6
CDC_KEY
VSSA
+5V6
390R
3541
220R
3543
(R)2.6V
(G)2V
(R)3.3V
(G)2.7V
10K
3540
BC857B
7441
(R)0.6V
(G)2.7V
6451
LTL-293SJ
10K
3542
390R
3545
220R
3547
10K
3544
BC857B
7444
6452
LTL-293SJ
10K
3546
390R
3549
220R
3600
10K
3550
BC857B
7447
6453
LTL-293SJ
10K
3548
10K
3597
(R)0V
(G)1.2V
(R)2.4V
(G)0.6V
7440
BC847B
(R)1.2V
(G)0.6V
7442
BC847B
(R)0.5V
(G)0.5V
3599 10K
3598 10K
7443
BC847B
7445
BC847B
7446
BC847B
7448
BC847B
3592
560R
3593
820R
3594
1K2
3595
2K2
3596
4K7
1451
EVQ21
1453
EVQ21
1454
EVQ21
1455
EVQ21
1456
EVQ21
1457
EVQ21
2450
220p
Vssa
CD_TEXT
DISC_1
DISC_2
DISC_3
DISC CHANGE
OPEN/CLOSE

Note: Some values may varies, see variant table for correct value.

ELECTRICAL PARTS LIST - FRONT BOARD

MISCELLANEOUS

1401	4822 135 00167	FTD Display BJ576GK-C
1402	4822 242 72527	Ceram Resonator 4MHz
1403	4822 242 70938	X'tal Resonator 32,768kHz
1404	4822 267 10736	Socket 18 pin
1408	4822 267 51453	Flex Cable Socket 12 pin
1411	4822 276 13114	Tact Switch
1412	4822 276 13114	Tact Switch
1413	4822 276 13114	Tact Switch
1414	4822 276 13114	Tact Switch
1415	4822 276 13114	Tact Switch
1416	4822 276 13114	Tact Switch
1421	4822 276 13114	Tact Switch
1422	4822 276 13114	Tact Switch
1423	4822 276 13114	Tact Switch
1424	4822 276 13114	Tact Switch
1425	4822 276 13114	Tact Switch
1431	4822 276 13114	Tact Switch
1432	4822 276 13114	Tact Switch
1433	4822 276 13114	Tact Switch
1434	4822 276 13114	Tact Switch
1435	4822 276 13114	Tact Switch
1441	4822 276 13114	Tact Switch
1442	4822 276 13114	Tact Switch
1443	4822 276 13114	Tact Switch
1444	4822 276 13114	Tact Switch
1445	4822 276 13114	Tact Switch
1446	4822 276 13114	Tact Switch
1449	4822 101 21261	Rotary Encoder 24P
1451	4822 276 13114	Tact Switch
1453	4822 276 13114	Tact Switch
1454	4822 276 13114	Tact Switch
1455	4822 276 13114	Tact Switch
1456	4822 276 13114	Tact Switch
1457	4822 276 13114	Tact Switch
1480	4822 267 10732	Flex Cable Socket 12 pin
1481	4822 267 10733	Flex Cable Socket 4 pin
1488	4822 242 72066	Ceram Resonator 8MHz
1489	4822 242 72195	Quarts 4,332MHz

CAPACITORS

2401	4822 124 80483	47µF 20% 6,3V
2403	4822 124 80483	47µF 20% 6,3V
2404	4822 124 11947	10µF 20% 16V
2405	4822 121 51252	470nF 5% 63V
2406	4822 121 51252	470nF 5% 63V
2407	4822 126 10002	100nF 20% 25V
2408	4822 126 13695	82pF 1% 63V
2409	4822 126 13695	82pF 1% 63V
2410	4822 122 32504	15pF 2% 50V
2411	4822 122 32504	15pF 2% 50V
2413	4822 122 33575	220pF 5% 50V
2414	4822 122 33575	220pF 5% 50V
2415	4822 122 33575	220pF 5% 50V
2416	4822 122 33575	220pF 5% 50V
2417	4822 122 33575	220pF 5% 50V
2418	4822 124 40998	22µF 20% 6,3V
2421	4822 122 33177	10nF 20% 50V
2422	4822 126 13838	100nF +80/-20% 50V
2423	4822 122 33177	10nF 20% 50V
2425	4822 126 12944	47nF 10% 50V
2426	4822 122 33175	2,2nF 20% 50V
2428	4822 122 33177	10nF 20% 50V
2429	4822 122 33177	10nF 20% 50V
2431	4822 124 41584	100µF 20% 10V
2433	4822 126 13296	100nF 10% 16V
2437	5322 122 32654	22nF 10% 63V
2438	5322 122 31865	1,5nF 10% 63V
2441	4822 122 33575	220pF 5% 50V
2442	4822 122 33575	220pF 5% 50V
2443	4822 122 33575	220pF 5% 50V
2444	4822 122 33575	220pF 5% 50V
2445	4822 122 33575	220pF 5% 50V
2446	5322 122 32531	100pF 5% 50V
2447	5322 122 32531	100pF 5% 50V
2448	5322 122 34123	1nF 10% 50V
2449	4822 122 33575	220pF 5% 50V
2450	4822 122 33575	220pF 5% 50V
2451	5322 122 32531	100pF 5% 50V
2452	5322 122 32531	100pF 5% 50V
2453	5322 122 32531	100pF 5% 50V
2454	5322 122 32531	100pF 5% 50V
2455	5322 122 32531	100pF 5% 50V
2456	5322 122 32531	100pF 5% 50V
2461	4822 124 40242	1µF 20% 63V
2462	4822 124 80483	47µF 20% 6,3V
2463	4822 124 40433	47µF 20% 25V
2465	5322 122 32659	33pF 5% 50V
2466	5322 122 32659	33pF 5% 50V
2467	4822 126 13838	100nF +80/-20% 50V
2468	5322 122 34123	1nF 10% 50V
2469	5322 122 34099	470pF 10% 63V
2471	4822 126 13692	47pF 1% 63V
2472	4822 126 13692	47pF 1% 63V
2473	4822 126 13692	47pF 1% 63V
2474	4822 126 13692	47pF 1% 63V
2475	4822 126 13296	100nF 10% 16V
2476	4822 126 13296	100nF 10% 16V
2477	4822 126 13692	47pF 1% 63V
2478	4822 126 13692	47pF 1% 63V
2479	4822 126 13692	47pF 1% 63V
2480	4822 126 13692	47pF 1% 63V
2481	5322 122 32531	100pF 5% 50V
2482	4822 126 13692	47pF 1% 63V
2484	4822 126 13296	100nF 10% 16V

ELECTRICAL PARTS LIST - FRONT BOARD

2485	4822 126 13695	82pF 1% 63V
2486	4822 126 13692	47pF 1% 63V
2487	4822 122 33173	560pF 10% 50V
2488	4822 122 33173	560pF 10% 50V
2489	4822 124 41576	2,2µF 20% 50V
2491	5322 122 32448	10pF 5% 50V
2492	5322 122 32448	10pF 5% 50V
2493	5322 122 32448	10pF 5% 50V
2494	4822 124 40433	47µF 20% 25V
2513	5322 122 32531	100pF 5% 50V
2514	5322 122 32531	100pF 5% 50V
2515	5322 122 32531	100pF 5% 50V
2516	5322 122 32531	100pF 5% 50V
2517	5322 122 32531	100pF 5% 50V
2518	5322 122 32531	100pF 5% 50V
2519	5322 122 32531	100pF 5% 50V
2520	5322 122 32531	100pF 5% 50V
2521	5322 122 32531	100pF 5% 50V
2522	5322 122 32531	100pF 5% 50V

RESISTORS

3401	4822 051 20101	100R 5% 0,1W
3402	4822 051 20101	100R 5% 0,1W
3403	4822 051 20101	100R 5% 0,1W
3404	4822 051 20101	100R 5% 0,1W
3405	4822 051 20101	100R 5% 0,1W
3406	4822 051 20101	100R 5% 0,1W
3407	4822 051 20101	100R 5% 0,1W
3408	4822 051 20101	100R 5% 0,1W
3409	4822 051 20101	100R 5% 0,1W
3410	4822 051 20101	100R 5% 0,1W
3411	4822 051 10102	1k 2% 0,25W
3412	4822 051 10102	1k 2% 0,25W
3413	4822 051 10102	1k 2% 0,25W
3414	4822 051 10102	1k 2% 0,25W
3415	4822 051 10102	1k 2% 0,25W
3416	4822 051 10102	1k 2% 0,25W
3417	4822 050 11002	1k 1% 0,4W
3418	4822 050 11002	1k 1% 0,4W
3419	4822 050 11002	1k 1% 0,4W
3420	4822 050 11002	1k 1% 0,4W
3421	4822 050 11002	1k 1% 0,4W
3422	4822 050 11002	1k 1% 0,4W
3423	4822 050 11002	1k 1% 0,4W
3424	4822 050 11002	1k 1% 0,4W
3425	4822 050 11002	1k 1% 0,4W
3426	4822 050 11002	1k 1% 0,4W
3427	4822 050 11002	1k 1% 0,4W
3428	4822 050 11002	1k 1% 0,4W
3429	4822 050 11002	1k 1% 0,4W
3430	4822 050 11002	1k 1% 0,4W
3431	4822 051 10102	1k 2% 0,25W
3432	4822 051 10102	1k 2% 0,25W
3433	4822 051 10102	1k 2% 0,25W
3434	4822 051 10102	1k 2% 0,25W
3435	4822 051 10102	1k 2% 0,25W
3436	4822 051 10102	1k 2% 0,25W
3437	4822 051 10102	1k 2% 0,25W
3439	4822 117 10833	10k 1% 0,1W
3440	4822 051 10102	1k 2% 0,25W
3441	4822 051 20331	330R 5% 0,1W
3442	4822 051 20331	330R 5% 0,1W
3443	4822 051 20331	330R 5% 0,1W
3445	4822 051 10102	1k 2% 0,25W
3446	4822 051 10102	1k 2% 0,25W
3449	4822 051 10102	1k 2% 0,25W
3453	4822 117 10833	10k 1% 0,1W
3454	4822 117 10833	10k 1% 0,1W
3455	4822 051 10102	1k 2% 0,25W
3456	4822 051 10102	1k 2% 0,25W
3457	4822 051 10102	1k 2% 0,25W
3458	4822 051 10102	1k 2% 0,25W
3460	4822 050 11002	1k 1% 0,4W
3461	4822 050 11002	1k 1% 0,4W
3462	4822 051 10102	1k 2% 0,25W
3463	4822 050 11002	1k 1% 0,4W
3466	4822 051 10102	1k 2% 0,25W
3468	4822 051 20101	100R 5% 0,1W
3470	4822 051 20104	100k 5% 0,1W
3471	4822 117 10833	10k 1% 0,1W
3472	4822 117 10833	10k 1% 0,1W
3473	4822 117 10833	10k 1% 0,1W
3474	4822 051 10102	1k 2% 0,25W
3475	4822 051 20101	100R 5% 0,1W
3476	4822 051 20104	100k 5% 0,1W
3477	4822 051 20101	100R 5% 0,1W
3478	4822 051 20101	100R 5% 0,1W
3479	4822 051 20101	100R 5% 0,1W
3489	4822 051 20101	100R 5% 0,1W
3490	4822 117 11504	270R 1% 0.1W
3491	4822 117 11504	270R 1% 0.1W
3492	4822 117 11504	270R 1% 0.1W
3493	4822 117 11504	270R 1% 0.1W
3494	4822 117 10833	10k 1% 0,1W
3495	4822 117 10833	10k 1% 0,1W
3496	4822 117 10833	10k 1% 0,1W
3497	4822 117 10833	10k 1% 0,1W
3501	4822 116 52195	47R 5% 0,5W
3502	4822 051 20479	47R 5% 0,1W
3503	4822 051 20479	47R 5% 0,1W
3504	4822 117 10353	150R 1% 0,1W
3505	4822 117 10353	150R 1% 0,1W
3506	4822 117 10353	150R 1% 0,1W
3507	4822 117 10353	150R 1% 0,1W

ELECTRICAL PARTS LIST - FRONT BOARD

RESISTORS

3508	4822 116 83868	150R 5% 0,5W
3509	4822 051 20331	330R 5% 0,1W
3510	4822 051 20479	47R 5% 0,1W
3511	4822 117 11503	220R 1% 0.1W
3512	4822 117 11503	220R 1% 0.1W
3513	4822 117 11503	220R 1% 0.1W
3514	4822 051 20472	4k7 5% 0,1W
3515	4822 051 20471	470R 5% 0,1W
3516	4822 051 20472	4k7 5% 0,1W
3517	4822 117 11503	220R 1% 0.1W
3518	4822 051 20472	4k7 5% 0,1W
3519	4822 051 20471	470R 5% 0,1W
3520	4822 051 20472	4k7 5% 0,1W
3521	4822 117 11503	220R 1% 0.1W
3522	4822 051 20472	4k7 5% 0,1W
3523	4822 051 20471	470R 5% 0,1W
3524	4822 051 20472	4k7 5% 0,1W
3525	4822 117 11503	220R 1% 0.1W
3526	4822 051 20472	4k7 5% 0,1W
3527	4822 051 20471	470R 5% 0,1W
3528	4822 051 20472	4k7 5% 0,1W
3529	4822 117 11503	220R 1% 0.1W
3530	4822 117 11503	220R 1% 0.1W
3533	4822 117 10834	47k 1% 0,1W
3534	4822 051 20224	220k 5% 0,1W
3535	4822 117 11449	2k2 1% 0,1W
3536	4822 051 20472	4k7 5% 0,1W
3537	4822 117 11507	6k8 1% 0,1W
3538	4822 051 20472	4k7 5% 0,1W
3539	4822 117 11507	6k8 1% 0,1W
3540	4822 117 10833	10k 1% 0,1W
3541	4822 051 20391	390R 5% 0,1W
3542	4822 117 10833	10k 1% 0,1W
3543	4822 117 11503	220R 1% 0.1W
3544	4822 117 10833	10k 1% 0,1W
3545	4822 051 20391	390R 5% 0,1W
3546	4822 117 10833	10k 1% 0,1W
3547	4822 117 11503	220R 1% 0.1W
3548	4822 117 10833	10k 1% 0,1W
3549	4822 051 20391	390R 5% 0,1W
3550	4822 117 10833	10k 1% 0,1W
3551	4822 051 20392	3k9 5% 0,1W
3552	4822 051 20561	560R 5% 0,1W
3553	4822 116 52231	820R 5% 0,5W
3554	4822 051 20122	1k2 5% 0,1W
3555	4822 117 11449	2k2 1% 0,1W
3556	4822 051 20472	4k7 5% 0,1W
3557	4822 117 10833	10k 1% 0,1W
3558	4822 117 11504	270R 1% 0.1W
3559	4822 117 11504	270R 1% 0.1W
3561	4822 051 20392	3k9 5% 0,1W
3562	4822 051 20561	560R 5% 0,1W
3563	4822 117 11454	820R 1% 0,1W
3564	4822 051 20122	1k2 5% 0,1W
3565	4822 117 11449	2k2 1% 0,1W
3566	4822 051 20472	4k7 5% 0,1W
3571	4822 116 52276	3k9 5% 0,5W
3572	4822 051 20561	560R 5% 0,1W
3573	4822 117 11454	820R 1% 0,1W
3574	4822 051 20122	1k2 5% 0,1W
3575	4822 116 52256	2k2 5% 0,5W
3578	4822 117 11504	270R 1% 0.1W
3579	4822 117 11504	270R 1% 0.1W
3581	4822 051 20392	3k9 5% 0,1W
3582	4822 051 20561	560R 5% 0,1W
3583	4822 117 11454	820R 1% 0,1W
3584	4822 116 52207	1k2 5% 0,5W
3585	4822 117 11449	2k2 1% 0,1W
3586	4822 051 20472	4k7 5% 0,1W
3590	4822 051 20472	4k7 5% 0,1W
3591	4822 051 20392	3k9 5% 0,1W
3592	4822 116 52226	560R 5% 0,5W
3593	4822 117 11454	820R 1% 0,1W
3594	4822 051 20122	1k2 5% 0,1W
3595	4822 117 11449	2k2 1% 0,1W
3596	4822 051 20472	4k7 5% 0,1W
3597	4822 117 10833	10k 1% 0,1W
3598	4822 117 10833	10k 1% 0,1W
3599	4822 117 10833	10k 1% 0,1W
3600	4822 117 11503	220R 1% 0.1W
3601	4822 116 83884	47K 5% 0,5W
3603	4822 050 11002	1k 1% 0,4W
3604	4822 051 20684	680k 5% 0,1W
3605	4822 051 20105	1M 5% 0,1W
3606	4822 051 10102	1k 2% 0,25W
3607	4822 051 20105	1M 5% 0,1W
3608	4822 051 10102	1k 2% 0,25W
3609	4822 051 10102	1k 2% 0,25W
3610	4822 117 10834	47K 1% 0,1W
3611	4822 051 10102	1k 2% 0,25W
3612	4822 051 10102	1k 2% 0,25W
3613	4822 051 10102	1k 2% 0,25W
3615	4822 117 10834	47K 1% 0,1W
3616	4822 117 10834	47K 1% 0,1W
3617	4822 050 11002	1k 1% 0,4W
3618	4822 051 10102	1k 2% 0,25W
3619	4822 051 10102	1k 2% 0,25W
3621	4822 051 10102	1k 2% 0,25W
3622	4822 051 10102	1k 2% 0,25W
3623	4822 051 10102	1k 2% 0,25W
3624	4822 051 10102	1k 2% 0,25W
3625	4822 051 10102	1k 2% 0,25W
3627	4822 051 10102	1k 2% 0,25W
3628	4822 051 10102	1k 2% 0,25W

ELECTRICAL PARTS LIST - FRONT BOARD

3629	4822 051 10102	1k 2% 0,25W
3630	4822 051 10102	1k 2% 0,25W
3631	4822 051 10102	1k 2% 0,25W
3632	4822 051 10102	1k 2% 0,25W
3633	4822 051 10102	1k 2% 0,25W
3634	4822 051 10102	1k 2% 0,25W
3635	4822 051 10102	1k 2% 0,25W
3636	4822 117 10833	10k 1% 0,1W
3637	4822 117 10833	10k 1% 0,1W
3638	4822 117 10833	10k 1% 0,1W
3639	4822 117 10833	10k 1% 0,1W
3640	4822 051 10102	1k 2% 0,25W
3643	4822 117 10833	10k 1% 0,1W
3644	4822 117 10833	10k 1% 0,1W
3645	4822 117 10833	10k 1% 0,1W
3646	4822 117 10833	10k 1% 0,1W
3647	4822 117 11449	2k2 1% 0,1W
3651	4822 051 20224	220k 5% 0,1W
3654	4822 051 20332	3k3 5% 0,1W
3658	4822 051 20332	3k3 5% 0,1W
3659	4822 117 10834	47K 1% 0,1W
3660	4822 051 20332	3k3 5% 0,1W
3662	4822 051 20332	3k3 5% 0,1W
3664	4822 051 10102	1k 2% 0,25W
3665	4822 051 10102	1k 2% 0,25W
3666	4822 051 10102	1k 2% 0,25W
3667	4822 051 20471	470R 5% 0,1W
3668	4822 051 10102	1k 2% 0,25W
3669	4822 051 10102	1k 2% 0,25W
3670	4822 051 10102	1k 2% 0,25W
3671	4822 051 10102	1k 2% 0,25W
3672	4822 051 10102	1k 2% 0,25W
3673	4822 051 10102	1k 2% 0,25W
3674	4822 050 11002	1k 1% 0,4W
3675	4822 050 11002	1k 1% 0,4W
3676	4822 050 11002	1k 1% 0,4W
3677	4822 116 52175	100R 5% 0,5W
3678	4822 116 52175	100R 5% 0,5W
3679	4822 051 20273	27k 5% 0,1W
3680	4822 051 20822	8k2 5% 0,1W
3681	4822 117 10834	47k 1% 0,1W
3682	4822 117 10834	47k 1% 0,1W
3686	4822 117 10834	47k 1% 0,1W
3687	4822 051 20472	4k7 5% 0,1W
3688	4822 051 20223	22k 5% 0,1W
3690	4822 117 10833	10k 1% 0,1W
3692	4822 117 10833	10k 1% 0,1W
3705	4822 117 11149	82k 1% 0,1W
3706	4822 116 52175	100R 5% 0,5W
3707	4822 117 11149	82k 1% 0,1W
3708	4822 116 52175	100R 5% 0,5W
3709	4822 117 11149	82k 1% 0,1W

3710	4822 116 52175	100R 5% 0,5W
3711	4822 117 11149	82k 1% 0,1W
3712	4822 116 52175	100R 5% 0,5W
3713	4822 117 11149	82k 1% 0,1W
3714	4822 116 52175	100R 5% 0,5W
3715	4822 117 11149	82k 1% 0,1W
3716	4822 116 52175	100R 5% 0,5W
4401	4822 051 20008	0R Jumper 0805
4402	4822 051 20008	0R Jumper 0805
4403	4822 051 20008	0R Jumper 0805
4406	4822 051 20008	0R Jumper 0805
4407	4822 051 20008	0R Jumper 0805
4408	4822 051 20008	0R Jumper 0805
4409	4822 051 20008	0R Jumper 0805
4410	4822 051 20008	0R Jumper 0805
4411	4822 051 20008	0R Jumper 0805
4412	4822 051 20008	0R Jumper 0805
4413	4822 051 20008	0R Jumper 0805
4414	4822 051 20008	0R Jumper 0805
4415	4822 051 20008	0R Jumper 0805
4416	4822 051 20008	0R Jumper 0805
4417	4822 051 20008	0R Jumper 0805
4418	4822 051 20008	0R Jumper 0805
4419	4822 051 20008	0R Jumper 0805
4423	4822 051 20008	0R Jumper 0805
4424	4822 051 20008	0R Jumper 0805
4425	4822 051 20008	0R Jumper 0805
4427	4822 051 20008	0R Jumper 0805
4428	4822 051 20008	0R Jumper 0805
4431	4822 051 20008	0R Jumper 0805
4432	4822 051 20008	0R Jumper 0805
4433	4822 051 20008	0R Jumper 0805
4434	4822 051 20008	0R Jumper 0805
4435	4822 051 20008	0R Jumper 0805
4436	4822 051 20008	0R Jumper 0805
4437	4822 051 20008	0R Jumper 0805
4438	4822 051 20008	0R Jumper 0805
4441	4822 051 20008	0R Jumper 0805
4442	4822 051 20008	0R Jumper 0805
4443	4822 051 20008	0R Jumper 0805
4444	4822 051 20008	0R Jumper 0805
4445	4822 051 20008	0R Jumper 0805
4450	4822 051 20008	0R Jumper 0805
4451	4822 051 20008	0R Jumper 0805
4452	4822 051 20008	0R Jumper 0805
4453	4822 051 20008	0R Jumper 0805
4454	4822 051 20008	0R Jumper 0805
4455	4822 051 20008	0R Jumper 0805
4456	4822 051 20008	0R Jumper 0805
4471	4822 051 20008	0R Jumper 0805
4472	4822 051 20008	0R Jumper 0805
4473	4822 051 20008	0R Jumper 0805

ELECTRICAL PARTS LIST - FRONT BOARD

RESISTORS

4501	4822 051 20008	0R Jumper 0805
4502	4822 051 20008	0R Jumper 0805
4503	4822 051 20008	0R Jumper 0805
4504	4822 051 20008	0R Jumper 0805
4505	4822 051 20008	0R Jumper 0805
4506	4822 051 20008	0R Jumper 0805
4507	4822 051 20008	0R Jumper 0805
4508	4822 051 20008	0R Jumper 0805
4509	4822 051 20008	0R Jumper 0805
4510	4822 051 20008	0R Jumper 0805
4511	4822 051 20008	0R Jumper 0805
4512	4822 051 20008	0R Jumper 0805
4513	4822 051 20008	0R Jumper 0805
4515	4822 051 20008	0R Jumper 0805
4516	4822 051 20008	0R Jumper 0805
4517	4822 051 20008	0R Jumper 0805
4518	4822 051 20008	0R Jumper 0805
4521	4822 051 20008	0R Jumper 0805
4522	4822 051 20008	0R Jumper 0805
4523	4822 051 20008	0R Jumper 0805
4524	4822 051 20008	0R Jumper 0805
4526	4822 051 20008	0R Jumper 0805
4527	4822 051 20008	0R Jumper 0805
4528	4822 051 20008	0R Jumper 0805
4532	4822 051 20008	0R Jumper 0805
4533	4822 051 20008	0R Jumper 0805
4535	4822 051 20008	0R Jumper 0805
4536	4822 051 20008	0R Jumper 0805
4537	4822 051 20008	0R Jumper 0805
4540	4822 051 20008	0R Jumper 0805
4541	4822 051 20008	0R Jumper 0805
4542	4822 051 20008	0R Jumper 0805
4543	4822 051 20008	0R Jumper 0805

COILS & FILTERS

5401	4822 156 21721	Coil 2,2µH 10%
5402	4822 156 21721	Coil 2,2µH 10%
5403	4822 156 21721	Coil 2,2µH 10%
5404	4822 156 21721	Coil 2,2µH 10%
5405	4822 156 21721	Coil 2,2µH 10%
5406	4822 156 21721	Coil 2,2µH 10%
5462	4822 156 21721	Coil 2,2µH 10%
5463	4822 156 21721	Coil 2,2µH 10%
5464	4822 156 21721	Coil 2,2µH 10%

DIODES

6401	4822 130 31878	1N4003G
6402	4822 130 31878	1N4003G
6403	4822 130 31878	1N4003G
6404	4822 130 31878	1N4003G
6411	4822 130 10791	LTL-1CHGE
6412	4822 130 10791	LTL-1CHGE
6413	4822 130 10791	LTL-1CHGE
6414	4822 130 10791	LTL-1CHGE
6415	4822 130 10791	LTL-1CHGE
6416	4822 130 10791	LTL-1CHGE
6417	4822 130 10791	LTL-1CHGE
6418	4822 130 10791	LTL-1CHGE
6420	4822 130 10791	LTL-1CHGE
6421	4822 130 10791	LTL-1CHGE
6422	4822 130 10791	LTL-1CHGE
6423	4822 130 10791	LTL-1CHGE
6424	4822 130 10791	LTL-1CHGE
6425	4822 130 10791	LTL-1CHGE
6426	4822 130 11138	LTL-1CHYE
6427	4822 130 11138	LTL-1CHYE
6428	4822 130 11138	LTL-1CHYE
6429	4822 130 11138	LTL-1CHYE
6430	4822 130 11138	LTL-1CHYE
6431	4822 130 10791	LTL-1CHGE
6432	4822 130 10791	LTL-1CHGE
6433	4822 130 10791	LTL-1CHGE
6434	4822 130 10791	LTL-1CHGE
6435	4822 130 10791	LTL-1CHGE
6436	4822 130 10774	LTL-293SJ
6437	4822 130 10774	LTL-293SJ
6438	4822 130 10774	LTL-293SJ
6439	4822 130 10774	LTL-293SJ
6451	4822 130 10774	LTL-293SJ
6452	4822 130 10774	LTL-293SJ
6453	4822 130 10774	LTL-293SJ
6461	4822 130 31878	1N4003G
6462	4822 130 31878	1N4003G
6463	4822 130 31878	1N4003G
6464	4822 130 30621	1N4148

TRANSISTORS & INTEGRATED CIRCUITS

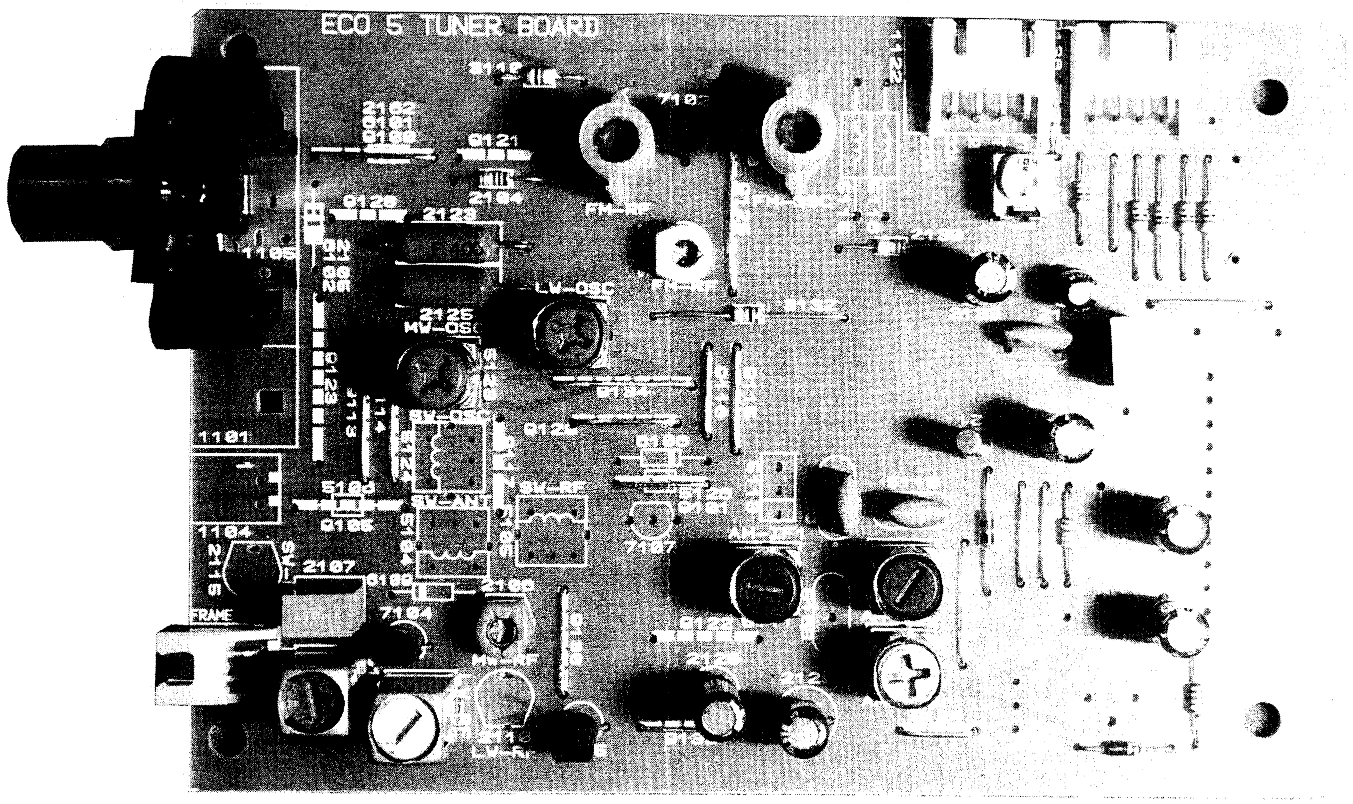
7401	4822 209 16476	TMP87CH74YF-860FS83831 Version 24
7402	4822 209 15449	74HC4094D
7403	4822 209 15449	74HC4094D
7405	4822 130 10165	GP1U28XP
7406	4822 130 60511	BC847B
7411	4822 130 60511	BC847B
7412	5322 130 60508	BC857B
7413	4822 130 60511	BC847B
7414	4822 130 60511	BC847B
7415	4822 130 60511	BC847B
7420	5322 130 60508	BC857B
7421	4822 130 60511	BC847B
7422	5322 130 60508	BC857B
7423	4822 130 60511	BC847B
7424	5322 130 60508	BC857B
7425	4822 130 60511	BC847B

ELECTRICAL PARTS LIST - FRONT BOARD

TRANSISTORS & INTEGRATED CIRCUITS

7426	5322 130 60508	BC857B
7427	4822 130 60511	BC847B
7429	4822 130 60511	BC847B
7431	4822 130 60511	BC847B
7433	4822 130 60511	BC847B
7434	4822 130 60511	BC847B
7435	4822 130 60511	BC847B
7436	4822 130 60511	BC847B
7437	4822 130 60511	BC847B
7438	4822 130 60511	BC847B
7440	4822 130 60511	BC847B
7441	5322 130 60508	BC857B
7442	4822 130 60511	BC847B
7443	4822 130 60511	BC847B
7444	5322 130 60508	BC857B
7445	4822 130 60511	BC847B
7446	4822 130 60511	BC847B
7447	5322 130 60508	BC857B
7448	4822 130 60511	BC847B
7461	4822 209 16477	TMP87CS71F-860AS83821 Version 24
7462	4822 209 31508	ST24C01B1
7463	4822 209 31981	SAA6579T

Note: Only the parts mentioned in this list are normal service spare parts.


ECO 5 TUNER BOARD
FM-RF
LW-OSC
MW-OSC
SW-OSC
SW-ANT
SW-RF
FRAME

TUNER BOARD ECO5

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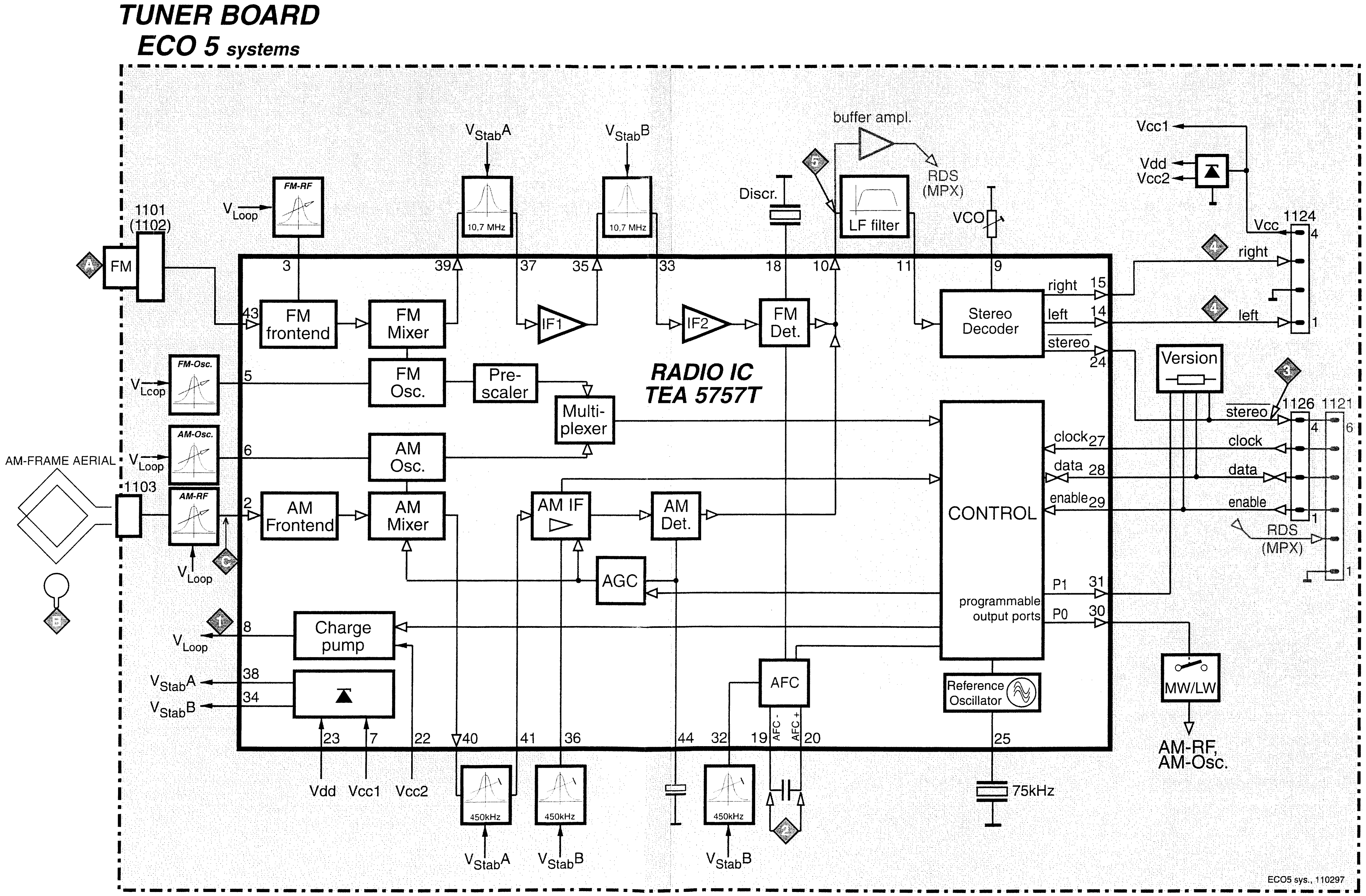
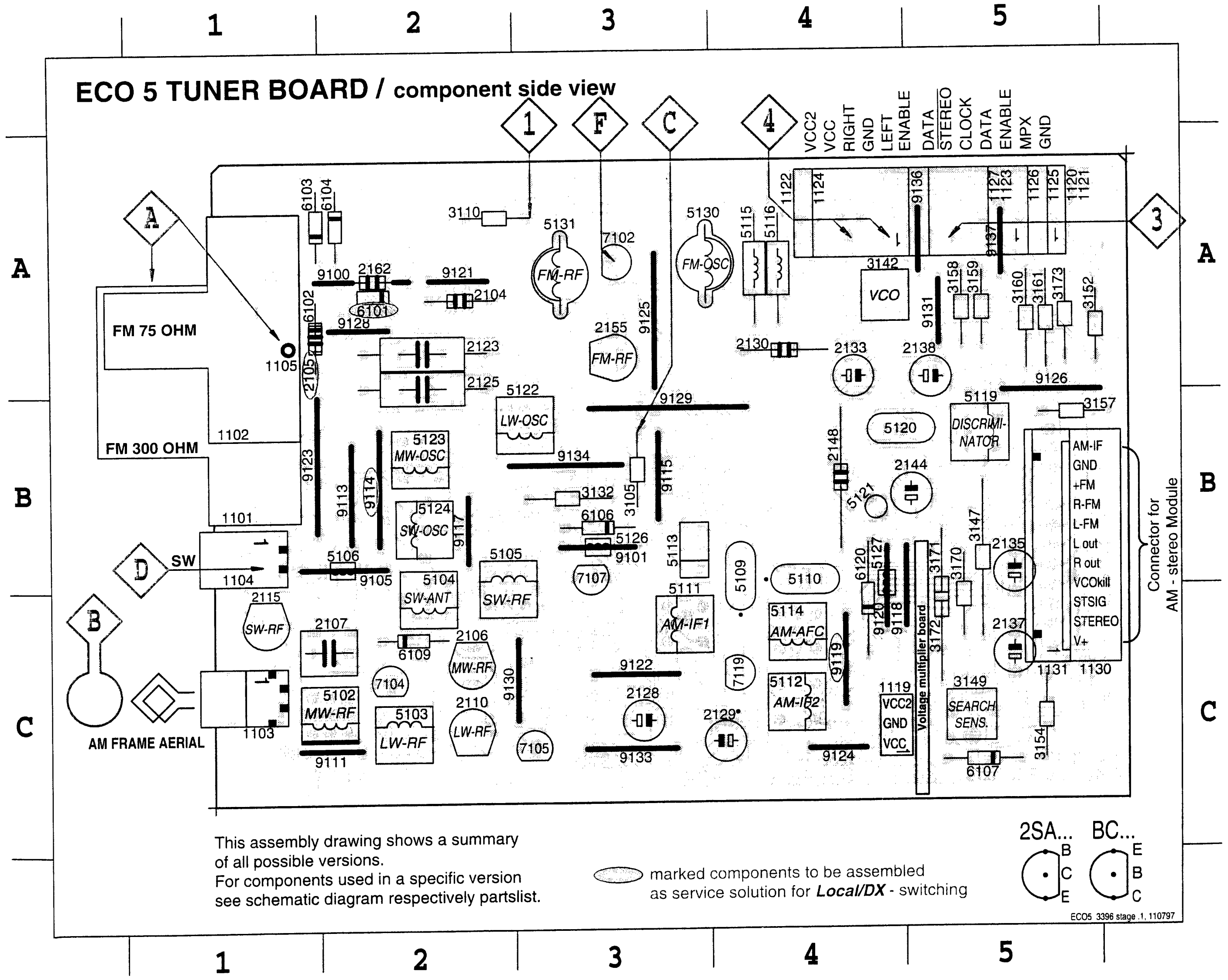
BLOCKDIAGRAM


TUNER BOARD
ECO 5 systems
RADIO IC
TEA 5757T
FM
1101
(1102)
AM-FRAME AERIAL
1103
FM-RF
FM-Osc.
AM-Osc.
AM-RF
V_{Loop}
V_{Lcop}
$V_{Stab}A$
$V_{Stab}B$
10,7 MHz
450kHz
FM frontend
FM Mixer
FM Osc.
Pre-scaler
Multi-plexer
AM Osc.
AM Frontend
AM Mixer
AM IF
AM Det.
AGC
IF1
IF2
FM Det.
Discr.
buffer ampl.
RDS (MPX)
LF filter
VCO
Stereo Decoder
CONTROL
programmable output ports
Charge pump
AFC
AFC -
AFC +
Reference Oscillator
75kHz
Vdd
Vcc1
Vcc2
Vcc
1124
1126
1121
right
left
stereo
clock
data
enable
P1
P0
Version
MW/LW
AM-RF, AM-Osc.
3 39 37 35 33 18 10 11 9 43 5 6 2 8 38 34 23 7 22 40 41 36 44 32 19 20 25 15 14 24 27 28 29 31 30
ECO5 sys., 110297

1101 A1	2106 C2	2137 C5	3149 C5	3173 A5	5114 C4	5130 A3	7104 C2	9117 B2	9129 B3
1102 A1	2107 C2	2138 A5	3152 A5	5102 C2	5115 A4	5131 A3	7105 C3	9118 B4	9130 C3
1103 C1	2110 C2	2144 B5	3154 C5	5103 C2	5116 A4	6101 A2	7107 B3	9119 C4	9131 A5
1104 B1	2115 C1	2148 B4	3157 B5	5104 C2	5119 B5	6102 A1	7119 C4	9120 B4	9133 C3
1105 A1	2123 A2	2155 A3	3158 A5	5105 B2	5120 B4	6103 A1	9100 A2	9121 A2	9134 B3
1119 C5	2125 A2	2162 A2	3159 A5	5106 B2	5121 B4	6104 A2	9101 B3	9122 C3	9136 A5
1120 A5	2128 C3	3105 B3	3160 A5	5109 B4	5122 B3	6106 B3	9105 B2	9123 B1	9137 A5
1130 B5	2129 C4	3110 A2	3161 A5	5110 B4	5123 B2	6107 C5	9111 C2	9124 C4	
1131 B5	2130 A4	3132 B3	3170 C5	5111 C3	5124 B2	6109 C2	9113 B2	9125 A3	
2104 A2	2133 A4	3142 A4	3171 C5	5112 C4	5126 B3	6120 C4	9114 B2	9126 B5	
2105 A1	2135 B5	3147 B5	3172 C5	5113 B3	5127 B4	7102 A3	9115 B3	9128 A2	

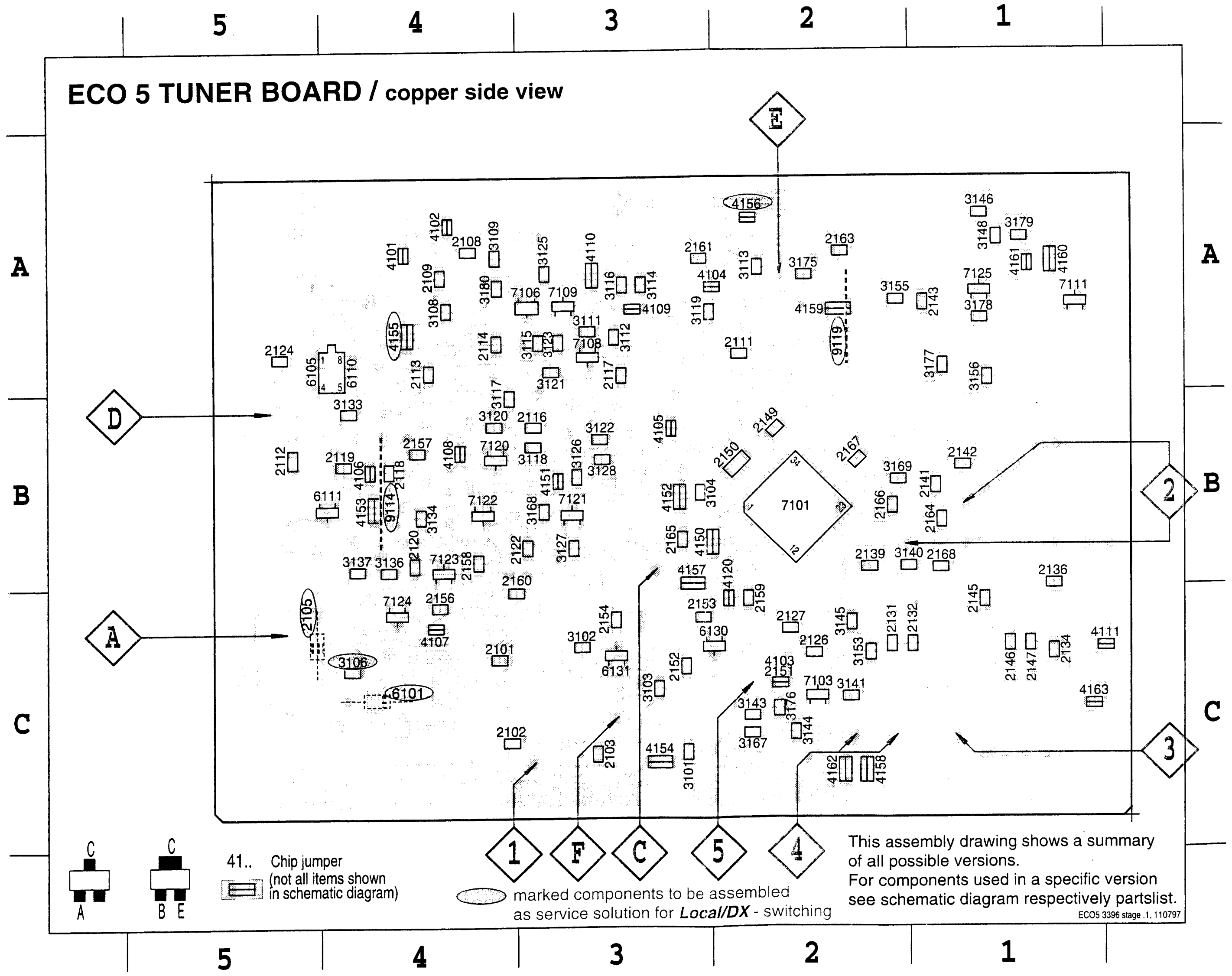

1
2
3
4
5
A
B
C
A
F
C
4
3
D
B
VCC2
VCC
RIGHT
GND
LEFT
ENABLE
DATA
STEREO
CLOCK
DATA
ENABLE
MPX
GND
FM 75 OHM
FM 300 OHM
SW
AM FRAME AERIAL
FM-RF
FM-OSC
VCO
LW-OSC
MW-OSC
SW-OSC
SW-ANT
SW-RF
MW-RF
LW-RF
AM-IF1
AM-AFC
AM-IF2
DISCRIMI-NATOR
SEARCH SENS.
Voltage multiplier board
AM-IF
GND
+FM
R-FM
L-FM
L out
R out
VCOkill
STSIG
STEREO
V+
Connector for AM - stereo Module
VCC2
GND
VCC
2SA...
BC...
B
C
E
ECO5 3396 stage 1, 110797

ECO 5 TUNER BOARD / component side view

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

marked components to be assembled as service solution for *Local/DX* - switching

2101 C4	2118 B4	2139 B2	2153 C3	2166 B2	3112 A3	3123 A3	3143 C2	3175 A2	4106 B4	4154 C3	6110 A4	7121 B3
2102 C4	2119 B4	2141 B1	2154 C3	2167 B2	3113 A2	3125 A3	3144 C2	3176 C2	4107 C4	4155 A4	6111 B4	7122 B4
2103 C3	2120 B4	2142 B1	2156 C4	2168 B1	3114 A3	3126 B3	3145 C2	3177 A1	4108 B4	4156 A2	6130 C2	7123 B4
2108 A4	2122 B3	2143 A1	2157 B4	3101 C3	3115 A3	3127 B3	3146 A1	3178 A1	4109 A3	4157 B3	6131 C3	7124 C4
2109 A4	2124 A5	2145 C1	2158 B4	3102 C3	3116 A3	3128 B3	3148 A1	3179 A1	4110 A3	4158 C2	7101 B2	7125 A1
2111 A2	2126 C2	2146 C1	2159 C2	3103 C3	3117 B4	3133 B4	3153 C2	3180 A4	4111 C1	4159 A2	7103 C2	
2112 B5	2127 C2	2147 C1	2160 C4	3104 B3	3118 B3	3134 B4	3155 A2	4101 A4	4120 C2	4160 A1	7106 A3	
2113 A4	2131 C2	2149 B2	2161 A3	3106 C4	3119 A3	3136 B4	3156 A1	4102 A4	4150 B2	4161 A1	7108 A3	
2114 A4	2132 C1	2150 B2	2163 A2	3108 A4	3120 B4	3137 B4	3167 C2	4103 C2	4151 B3	4162 C1	7109 A3	
2116 B3	2134 C1	2151 C2	2164 B1	3109 A4	3121 A3	3140 B2	3168 B3	4104 A2	4152 B3	4163 C1	7111 A1	
2117 A3	2136 B1	2152 C3	2165 B3	3111 A3	3122 B3	3141 C2	3169 B2	4105 B3	4153 B4	6105 A4	7120 B4	


5
4
3
2
1
A
B
C
E
D
A
2
3
1
F
C
5
4
7101
C
B E
A
C
41..
Chip jumper
(not all items shown in schematic diagram)
ECO5 3396 stage 1, 110797

ECO 5 TUNER BOARD / copper side view

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

marked components to be assembled as service solution for *Local/DX* - switching

TUNER

Wave
VARICAF
FM 87.5 - 1 (65.81 - 74, 8
MW FM/AM-versio 530 - 1
FM/MW-versio 531 - 1
LW 153 - 27
MW FM/MW/LW- 531 - 16
FM IF
FM
FM RF
FM 87.5 - (65.81 - 74,
VCO
FM
AM IF
MW
AM AFC **MW**
AM RF 3
MW 4) FM/MW/LW- a (9kH 531 - 1
LW
MW FM/AM-versi 530 - 1

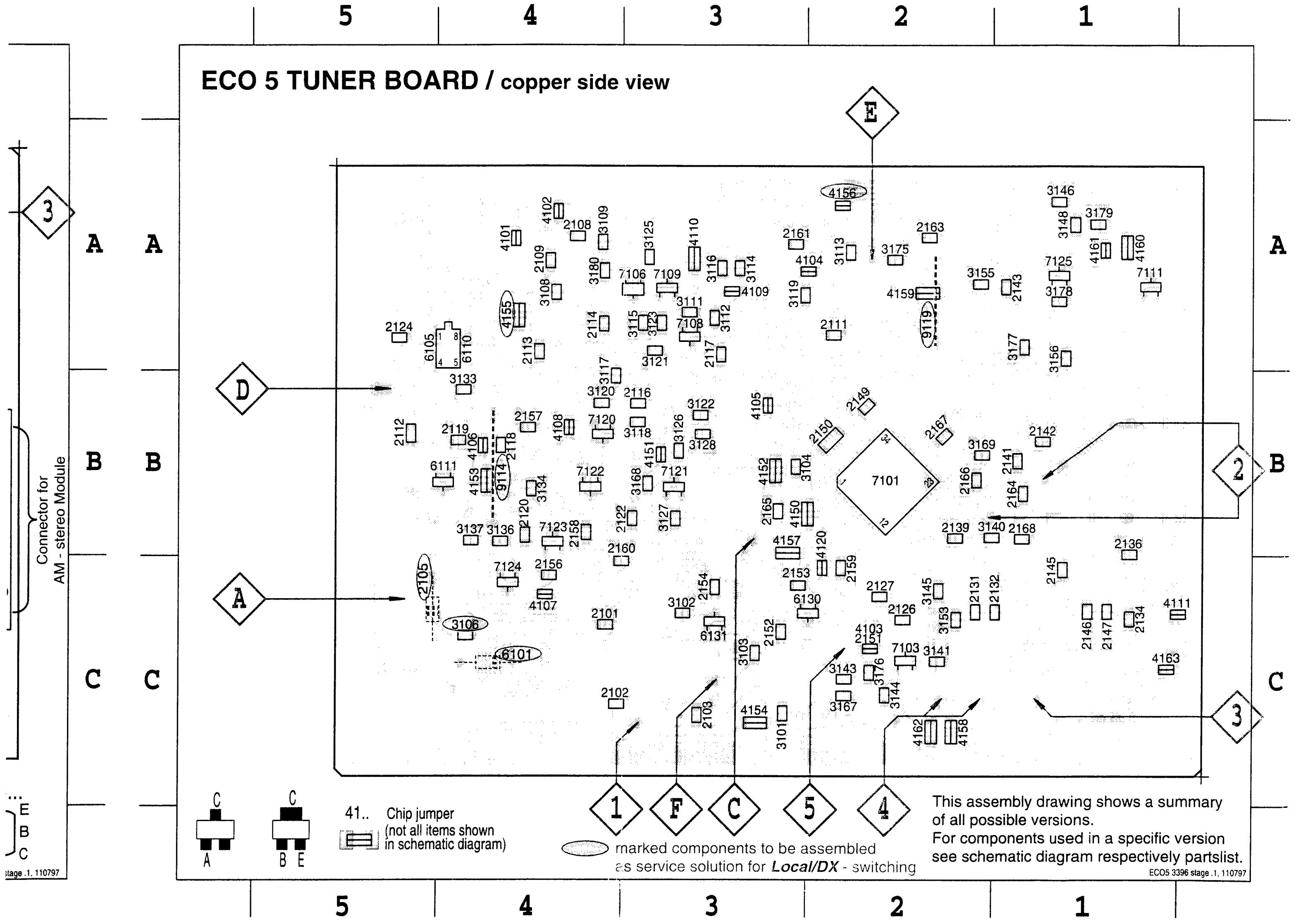
Use service

1) If sensitivi
(input sign

3) For AM R

↕ Repeat

2101	C4	2118	B4	2139	B2	2153	C3	2166	B2	3112	A3	3123	A3	3143	C2	3175	A2	4106	B4	4154	C3	6110	A4	7121	B3
2102	C4	2119	B4	2141	B1	2154	C3	2167	B2	3113	A2	3125	A3	3144	C2	3176	C2	4107	C4	4155	A4	6111	B4	7122	B4
2103	C3	2120	B4	2142	B1	2156	C4	2168	B1	3114	A3	3126	B3	3145	C2	3177	A1	4108	B4	4156	A2	6130	C2	7123	B4
2108	A4	2122	B3	2143	A1	2157	B4	3101	C3	3115	A3	3127	B3	3146	A1	3178	A1	4109	A3	4157	B3	6131	C3	7124	C4
2109	A4	2124	A5	2145	C1	2158	B4	3102	C3	3116	A3	3128	B3	3148	A1	3179	A1	4110	A3	4158	C2	7101	B2	7125	A1
2111	A2	2126	C2	2146	C1	2159	C2	3103	C3	3117	B4	3133	B4	3153	C2	3180	A4	4111	C1	4159	A2	7103	C2		
2112	B5	2127	C2	2147	C1	2160	C4	3104	B3	3118	B3	3134	B4	3155	A2	4101	A4	4120	C2	4160	A1	7106	A3		
2113	A4	2131	C2	2149	B2	2161	A3	3106	C4	3119	A3	3136	B4	3156	A1	4102	A4	4150	B2	4161	A1	7108	A3		
2114	A4	2132	C1	2150	B2	2163	A2	3108	A4	3120	B4	3137	B4	3167	C2	4103	C2	4151	B3	4162	C1	7109	A3		
2116	B3	2134	C1	2151	C2	2164	B1	3109	A4	3121	A3	3140	B2	3168	B3	4104	A2	4152	B3	4163	C1	7111	A1		
2117	A3	2136	B1	2152	C3	2165	B3	3111	A3	3122	B3	3141	C2	3169	B2	4105	B3	4153	B4	6105	A4	7120	B4		



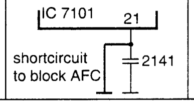
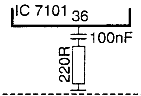
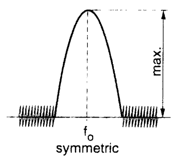
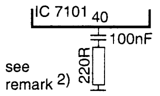
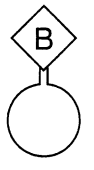
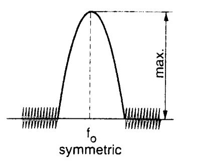
ECO 5 TUNER BOARD / copper side view

41.. Chip jumper (not all items shown in schematic diagram)

marked components to be assembled as service solution for *Local/DX* - switching

This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram respectively partslist.

TUNER ADJUSTMENT TABLE (ECO5 FM/MW- and FM/MW/LW - versions with AM-frame aerial)

Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
VARICAP ALIGNMENT						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)			108MHz	5130	1	8V ±0.2V
			87.5MHz (65.81MHz)	check		4.3V ±0.5V (1.2V ±0.5V)
MW FM/AM-version, 10kHz grid 530 - 1700kHz			1700kHz	5123		8V ±0.2V
			530kHz	check		1.1V ±0.4V
FM/MW-version, 9kHz grid 531 - 1602kHz			1602kHz	5123		6.9V ±0.2V
			531kHz	check		1.1V ±0.4V
LW 153 - 279kHz			279kHz	5122		8V ±0.2V
			153kHz	check		1.1V ±0.4V
MW FM/MW/LW- version, 9kHz grid 531 - 1602kHz			1602kHz	5123		8V ±0.2V
			531kHz	check		1.1V ±0.4V
FM IF						
FM	10.7MHz, 50mV continuous wave	F	 IC 7101 21 shortcircuit to block AFC 2141	5119	2	0 ± 3 mV DC
FM RF						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)	108MHz	A	108MHz	2155	4	MAX
	87.5MHz (65.81MHz)	mod=1kHz Δf=±22.5kHz	87.5MHz (65.81MHz)	5131		
VCO						
FM	98MHz, 1mV continuous wave	A	98MHz	3142	3	152kHz ±1kHz [1]
AM IF						
MW	450kHz connect pin 6 of IC 7101 (AM Osc.) with short wire to ground (pin 4)	C Δf=±15kHz V_{RF} = 3mV	 IC 7101 36 100nF 220R	5111	4	 max. f_o symmetric
			 IC 7101 40 100nF 220R see remark [2]	5112		
AM AFC **MW**		C continuous wave V_{RF} = 10mV		5114	2	0 ± 2 mV DC
AM RF [3]						
MW [4] FM/MW/LW- and FM/MW-version (9kHz grid) 531 - 1602kHz	1494kHz	 B Δf = ±30kHz V_{RF} as low as possible	1494kHz	2106	4	 max. f_o symmetric
	558kHz		558kHz	5102		
LW	198kHz		198kHz	5103		
MW FM/AM-version, 10kHz grid 530 - 1700kHz	1500kHz		1500kHz	2106		
	560kHz		560kHz	5102		

ECO5, discr. coil, 090797

Use service test program. By selecting the TUNER TEST test frequencies will be stored as preset frequencies automatically.

[1] If sensitivity of frequency counter is too low adjust to max. channel separation (input signal: stereo left 90% + 9%, adjust output on right channel to minimum)

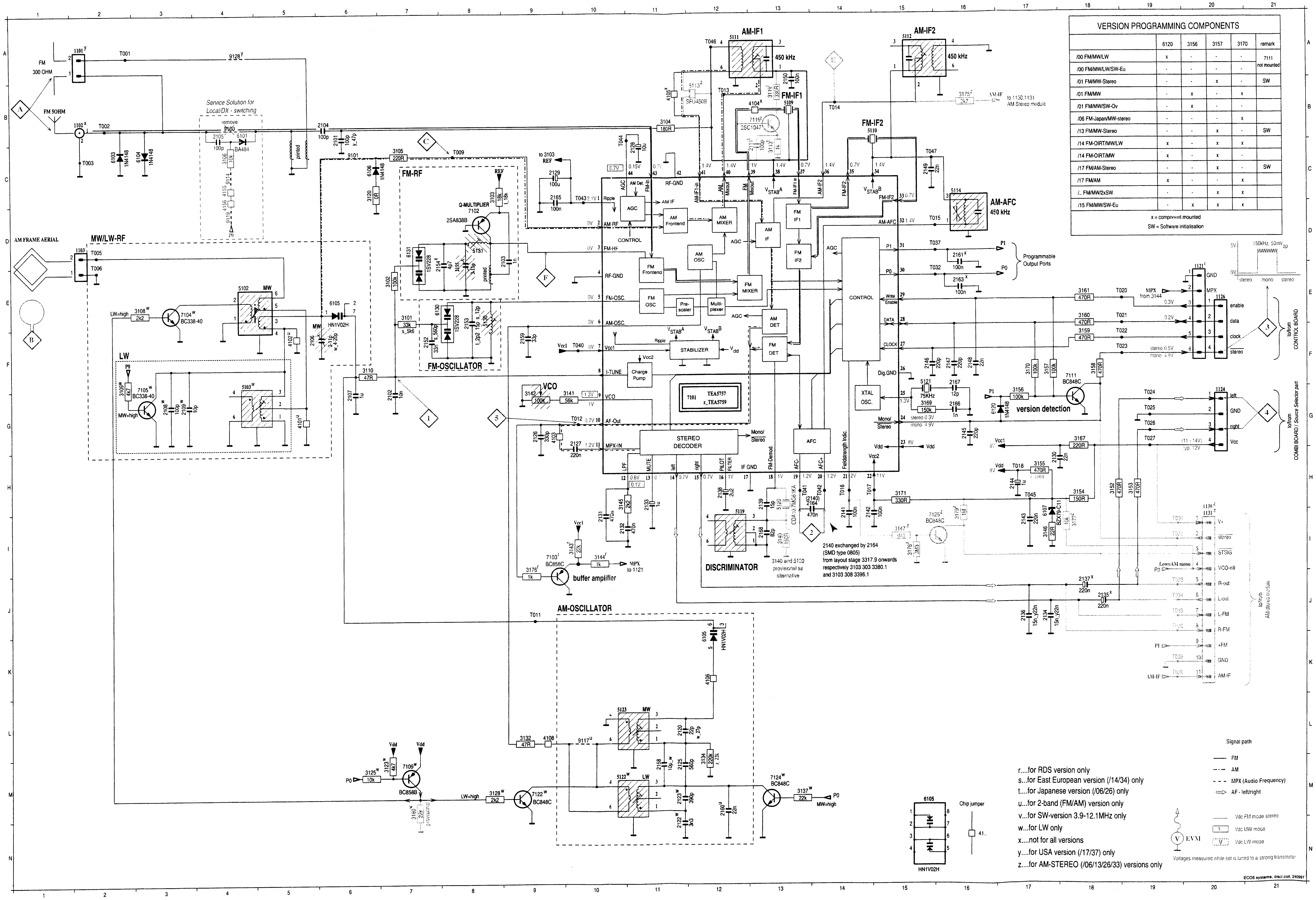
[2] RC network serves for damping the IF-filter while adjusting the other one.

[3] For AM RF adjustments the original frame antenna has to be used !

[4] MW has to be aligned before LW.

↕ Repeat

TUNER BOARD ECO5 / Systems


FM 300 OHM
FM 50OHM
AM FRAME AERIAL
MW/LW-RF
LW
MW
Service Solution for Local/DX - switching
remove 9120
FM-RF
Q-MULTIPLIER 7102
2SA838B
FM-OSCILLATOR
VCO
AM-IF1
450 kHz
AM-IF2
450 kHz
FM-IF1
2SC1047
FM-IF2
AM-AFC
450 kHz
AGC
AM Frontend
AM MIXER
AM IF
FM IF1
FM IF2
AM OSC
FM Frontend
FM MIXER
FM OSC
Pre-scaler
Multi-plexer
AM DET
FM DET
STABILIZER
Charge Pump
TEA5757
z_TEA5759
STEREO DECODER
AFC
CONTROL
XTAL OSC.
DISCRIMINATOR
2140 exchanged by 2164 (SMD type 0805) from layout stage 3317.9 onwards respectively 3103 303 3380.1 and 3103 308 3396.1
3140 and 5120 provisional as alternative
Programmable Output Ports
buffer amplifier
version detection
AM-OSCILLATOR
LW=high
MW=high
to 1130,1131 AM Stereo module
to/from CONTROL BOARD
to/from COMBI BOARD / Source Selector part
to/from AM-stereo module
enable
data
clock
stereo
left
GND
right
Vcc
150kHz, 50mV pp
5V
0V
stereo
mono
stereo
6105
HN1V02H
Chip jumper
41
ECO5 systems, discr.coil, 240997

	6120	3156	3157	3170	remark
/00 FM/MW/LW	x	-	-	-	7111 not mounted
/00 FM/MW/LW/SW-Eu	-	-	-	-	
/01 FM/MW-Stereo	-	-	x	-	SW
/01 FM/MW	-	x	-	x	
/01 FM/MW/SW-Ov	-	x	-	-	
/06 FM-Japan/MW-stereo	-	-	-	x	
/13 FM/MW-Stereo	-	-	x	-	SW
/14 FM-OIRT/MW/LW	x	-	x	x	
/14 FM-OIRT/MW	x	-	x	-	
/17 FM/AM-Stereo	-	-	x	-	SW
/17 FM/AM	x	-	-	x	
/.. FM/MW/2xSW	-	-	x	x	
/15 FM/MW/SW-Eu	-	x	x	x	

VERSION PROGRAMMING COMPONENTS

x = component mounted

SW = Software initialisation

r....for RDS version only
s...for East European version (/14/34) only
t....for Japanese version (/06/26) only
u...for 2-band (FM/AM) version only
v...for SW-version 3.9-12.1MHz only
w...for LW only
x....not for all versions
y....for USA version (/17/37) only
z....for AM-STEREO (/06/13/26/33) versions only

Signal path

— FM
-·- AM
- - - MPX (Audio Frequency)
⇨ AF - left/right

EVM

.... Vdc FM mode stereo
V Vdc MW mode
V Vdc LW mode

Voltages measured while set is tuned to a strong transmitter

1101	A 1
1102	B 2
1103	D 2
1121	E20
1124	G20
1126	E20
1130	I20
1131	I20
2101	C 6
2102	G 7
2103	D 9
2104	B 6
2106	F 5
2107	G 6
2108	G 3
2109	G 3
2111	C13
2120	L11
2122	N11
2123	M11
2125	M11
2126	G 9
2127	G10
2128	C11
2129	C 9
2130	H17
2131	I10
2132	I10
2133	H11
2134	J17
2135	J18
2136	J17
2137	J18
2138	H12
2139	H13
2140	H14
2141	H14
2142	H14
2143	I17
2144	H17
2145	G16
2146	F15
2147	F16
2148	F16
2149	C15
2150	B13
2152	F 7
2153	E 8
2154	E 7
2155	D 8
2158	M11
2159	F 9
2160	M12
2161	D16
2163	E16
2164	H14
2165	C 9
2166	G16
2167	F16
2168	I 13
3101	E 7
3102	E 7
3103	C 8
3104	B11
3105	C 7
3108	E 3
3109	F 2
3110	F 6
3113	C13
3119	B13
3120	C 6
3123	M 7
3125	M 6
3128	M 8
3132	L 9
3134	M12
3137	M13
3140	I13
3141	G10
3142	G 9
3143	I10
3144	I10
3145	H10
3146	I17
3147	I15
3152	H18
3153	H19
3154	H18
3155	H17
3156	G17
3157	F17
3158	F18
3159	F18
3160	E18
3161	E18
3167	G18
3169	G15
3170	F17
3171	H15
3175	B16
3176	J 9
3177	I18
3178	I15
3179	I16
3180	M7
4101	G 5
4102	F 5
4103	G 9
4104	B13
4105	B11
4106	K12
4108	L 9
5102	E 4
5103	F 4
5109	B13
5110	B14
5111	A13
5112	A15
5113	B12
5114	C16
5119	I 12
5120	H13
5121	F15
5122	M11
5123	L11
5130	E 8
5131	D 8
6103	C 2
6104	C 3
6105	K12
6105	E 6
6106	C 6
6107	H17
6120	G16
6130	E 7
6131	D 7
7101	G11
7102	D 8
7103	I 9
7104	E 3
7105	F 2
7109	M 7
7111	F18
7119	B13
7122	M 9
7124	M13
7125	I16
9100	B 4
9101	C 6
9117	L10
9128	A 4

ELECTRICAL PARTS LIST - ECO5 TUNER BOARD

MISCELLANEOUS

1101	4822 267 31505	Antenna Socket 300R	
1102	4822 267 10283	Antenna Socket Coax IEC 75R	

CAPACITORS

2101	5322 122 32531	100pF 5% 50V	
2101	4822 126 13692	47pF 1% 63V	for USA
2102	4822 122 33177	10nF 20% 50V	
2103	5322 122 34123	1nF 10% 50V	
2104	4822 122 33195	100pF 10% 50V	
2106	4822 125 50355	Trimmer 4-20pF	for LW version
2106	4822 125 60101	Trimmer 3-11pF 100V	
2107	4822 121 51319	1µF 10% 63V	
2108	5322 122 32531	100pF 5% 50V	for LW version
2109	5322 122 32448	10pF 5% 50V	for LW version
2120	4822 126 13691	27pF 1% 63V	for LW version
2120	5322 122 32658	22pF 5% 50V	
2122	4822 122 33891	3,3nF 10% 63V	for LW version
2125	4822 121 51381	560pF 5% 400V	
2126	5322 122 31863	330pF 5% 50V	
2127	4822 126 13473	220nF +80/-20% 50V	
2128	4822 124 41579	10µF 20% 50V	
2129	4822 124 41584	100µF 20% 10V	
2130	4822 126 11585	22nF+80/- 20% 25V	
2131	4822 122 33325	470nF 16V	
2132	4822 122 33325	470nF 16V	
2131	4822 126 13482	470nF +80/- 20% 16V	
2132	4822 126 13482	470nF +80/- 20% 16V	
2133	4822 124 40242	1µF 20% 63V	
2134	4822 126 13188	15nF 5% 63V	
2134	5322 122 32654	22nF 10% 63V	for USA
2135	4822 124 40746	0,22µF 20% 63V	
2136	4822 126 13188	15nF 5% 63V	
2136	5322 122 32654	22nF 10% 63V	for USA
2137	4822 124 40746	0,22µF 20% 63V	
2138	4822 124 41576	2,2µF 20% 50V	
2139	4822 126 14236	50V 15pF 5%	
2140	4822 121 51252	470nF 5% 63V	
2141	4822 126 10002	100nF 20% 25V	
2142	4822 126 10002	100nF 20% 25V	
2143	4822 126 13473	220nF +80/-20% 50V	
2144	4822 124 40242	1µF 20% 63V	
2145	4822 122 33575	220pF 5% 50V	
2146	4822 122 33575	220pF 5% 50V	
2147	4822 122 33575	220pF 5% 50V	
2148	4822 126 11585	22nF+80/- 20% 25V	
2149	5322 122 32654	22nF 10% 63V	
2150	4822 122 31947	100nF 20% 63V	
2152	5322 116 80853	560pF 5% 63V	for East. Europe
2152	4822 126 12105	33nF 5% 63V	
2153	4822 122 32139	12pF 2% 63V	for East. Europe
2153	4822 122 32504	15pF 2% 63V	
2155	4822 125 60101	Trimmer 3-11pF 100V	
2158	5322 122 32448	10pF 5% 50V	for LW version
2159	5322 122 32659	33pF 5% 50V	
2160	5322 122 32654	22nF 10% 63V	
2161	4822 126 10002	100nF 20% 25V	
2163	4822 126 10002	100nF 20% 25V	
2164	4822 126 13482	470nF +80/- 20% 16V	
2165	4822 126 10002	100nF 20% 25V	
2166	5322 122 34123	1nF 10% 50V	
2167	4822 122 32139	12pF 2% 63V	
2168	4822 126 13695	82pF 1% 63V	

RESISTORS

3101	4822 051 20562	5k6 5% 0,1W	for East. Europe
3101	4822 051 20333	33k 5% 0,1W	
3102	4822 051 20104	100k 5% 0,1W	
3103	4822 117 10965	18k 1% 0,1W	
3104	4822 117 11448	180R 1% 0,1W	
3105	4822 116 83872	220R 5% 0,5W	
3108	4822 117 11449	2k2 1% 0,1W	for LW version
3109	4822 051 20472	4k7 5% 0,1W	for LW version
3110	4822 116 52195	47R 5% 0,5W	
3120	4822 051 20008	0R Jumper 0805	
3123	4822 051 20472	4k7 5% 0,1W	for LW version
3125	4822 117 10833	10k 1% 0,1W	for LW version
3128	4822 117 11449	2k2 1% 0,1W	for LW version
3132	4822 116 52195	47R 5% 0,5W	
3134	4822 051 20224	220k 5% 0,1W	
3137	4822 051 20223	22k 5% 0,1W	for LW version
3140	4822 051 20008	0R Jumper 0805	
		5120=CDA10.7MG40K	
3140	4822 117 10353	150R 1% 0,1W	
		5120=CDA10.7MG61KA	
3141	4822 051 20563	56k 5% 0,1W	
3142	4822 100 11163	Trimmer 100k 30% 0,1W	
3143	4822 051 20223	22k 5% 0,1W	for RDS version
3144	4822 051 10102	1k 2% 0,25W	for RDS version
3145	4822 117 11449	2k2 1% 0,1W	
3146	4822 051 20229	22R 5% 0,1W	
3152	4822 116 83883	470R 5% 0,5W	
3153	4822 051 20471	470R 5% 0,1W	
3154	4822 116 83868	150R 5% 0,5W	
3155	4822 051 20471	470R 5% 0,1W	
3156	4822 051 20104	100k 5% 0,1W	for /21/30/33 only
3157	4822 116 52234	100k 5% 0,5W	for East. Europe
3158	4822 116 83883	470R 5% 0,5W	
3159	4822 116 83883	470R 5% 0,5W	
3160	4822 116 83883	470R 5% 0,5W	
3161	4822 116 83883	470R 5% 0,5W	
3167	4822 117 11503	220R 1% 0.1W	
3169	4822 051 20154	150k 5% 0,1W	
3170	4822 116 52234	100k 5% 0,5W	
3171	4822 116 52219	330R 5% 0,5W	

3176	4822 051 10102	1k 2% 0,25W	for RDS version
4101	4822 051 20008	0R Jumper 0805	for 2-Band only
4102	4822 051 20008	0R Jumper 0805	for 2-Band only
4103	4822 051 20008	0R Jumper 0805	
4104	4822 051 20008	0R Jumper 0805	
4105	4822 051 20008	0R Jumper 0805	
4106	4822 051 20008	0R Jumper 0805	
4108	4822 051 20008	0R Jumper 0805	
4111	4822 051 20008	0R Jumper 0805	
4120	4822 051 20008	0R Jumper 0805	
4150	4822 051 10008	0R Jumper 1206	
4151	4822 051 20008	0R Jumper 0805	
4152	4822 051 10008	0R Jumper 1206	
4153	4822 051 10008	0R Jumper 1206	
4154	4822 051 10008	0R Jumper 1206	
4155	4822 051 10008	0R Jumper 1206	
4156	4822 051 20008	0R Jumper 0805	
4157	4822 051 10008	0R Jumper 1206	
4158	4822 051 10008	0R Jumper 1206	
4159	4822 051 10008	0R Jumper 1206	
4162	4822 051 10008	0R Jumper 1206	

COILS & FILTERS

5102	4822 157 71634	MW RF Coil	
5103	4822 157 71635	LW RF Coil	for LW version
5109	4822 242 70665	Ceram Filter 10,7MHz	
5110	4822 242 70665	Ceram Filter 10,7MHz	
5111	4822 158 60511	AM-IF Filter 450kHz	
5112	4822 157 70302	AM-IF Filter 450kHz	
5114	4822 157 70302	AM-IF Filter 450kHz	
5119	4822 157 11443	Discriminator 10,7MHz	
5120	4822 242 82065	Cer. Disc. 10,7MG40K	
5120	4822 242 10251	Cer. Disc.10,7MG61KA-TF21	
5121	4822 242 10261	Quartz 75kHz	
5122	4822 157 60517	Osc. Coil LW	for LW version
5123	4822 157 60517	Osc. Coil MW	
5130	4822 156 30947	RF-Coil 1.5T	
5131	4822 156 30947	RF-Coil 1.5T	

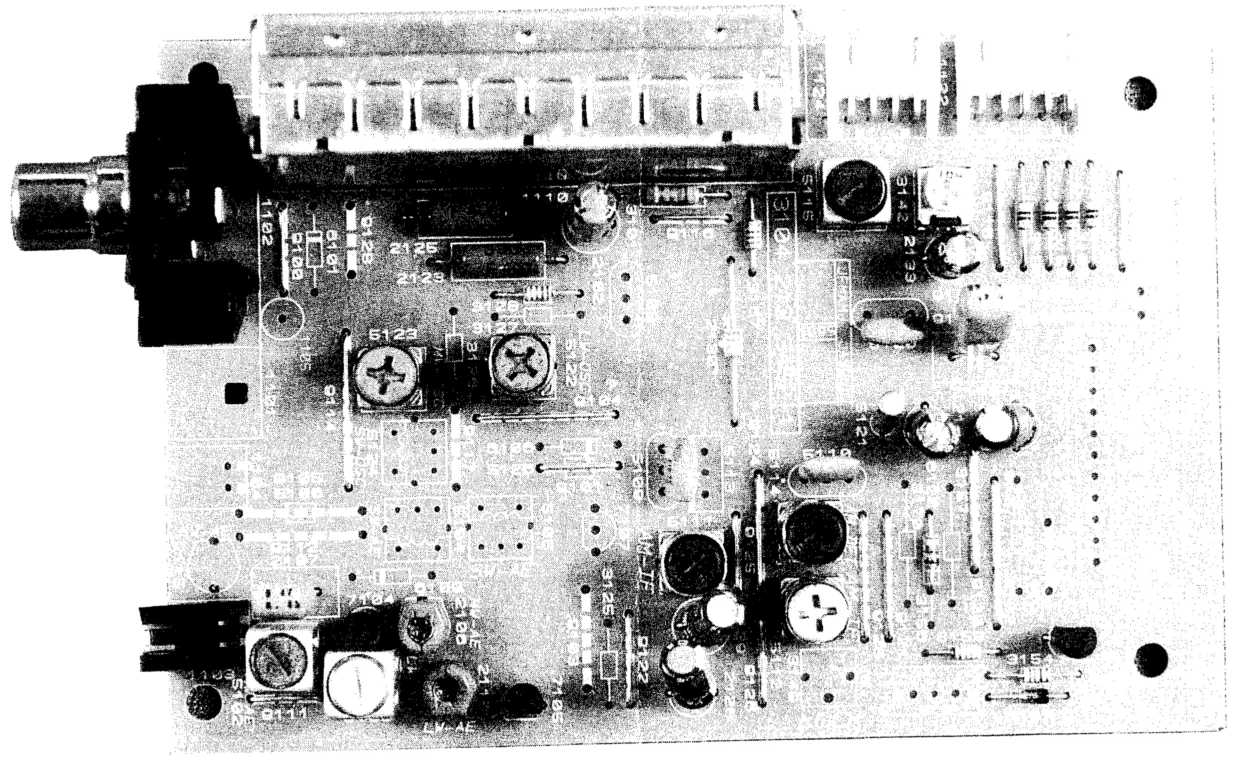
DIODES

6103	4822 130 30621	1N4148	
6104	4822 130 30621	1N4148	
6105	4822 130 83075	HN1V02H-B	
6106	4822 130 30621	1N4148	
6107	4822 130 34488	BZX79-B11	
6120	4822 130 30621	1N4148	not for /21/30/33
6130	4822 130 82833	1SV228	
6131	4822 130 82833	1SV228	

TRANSISTORS & INTEGRATED CIRCUITS

7101	4822 209 90924	TEA5757H/V1	
7102	4822 130 60093	2SA838B	
7103	4822 130 42513	BC858C	for RDS version
7104	5322 130 44779	BC338-40	for LW version
7105	5322 130 44779	BC338-40	for LW version
7109	5322 130 41983	BC858B	for LW version
7111	5322 130 42136	BC848C	
7122	5322 130 42136	BC848C	for LW version
7124	5322 130 42136	BC848C	for LW version

Note: Only the parts mentioned in this list are normal service spare parts.



TUNER 95 BOARD

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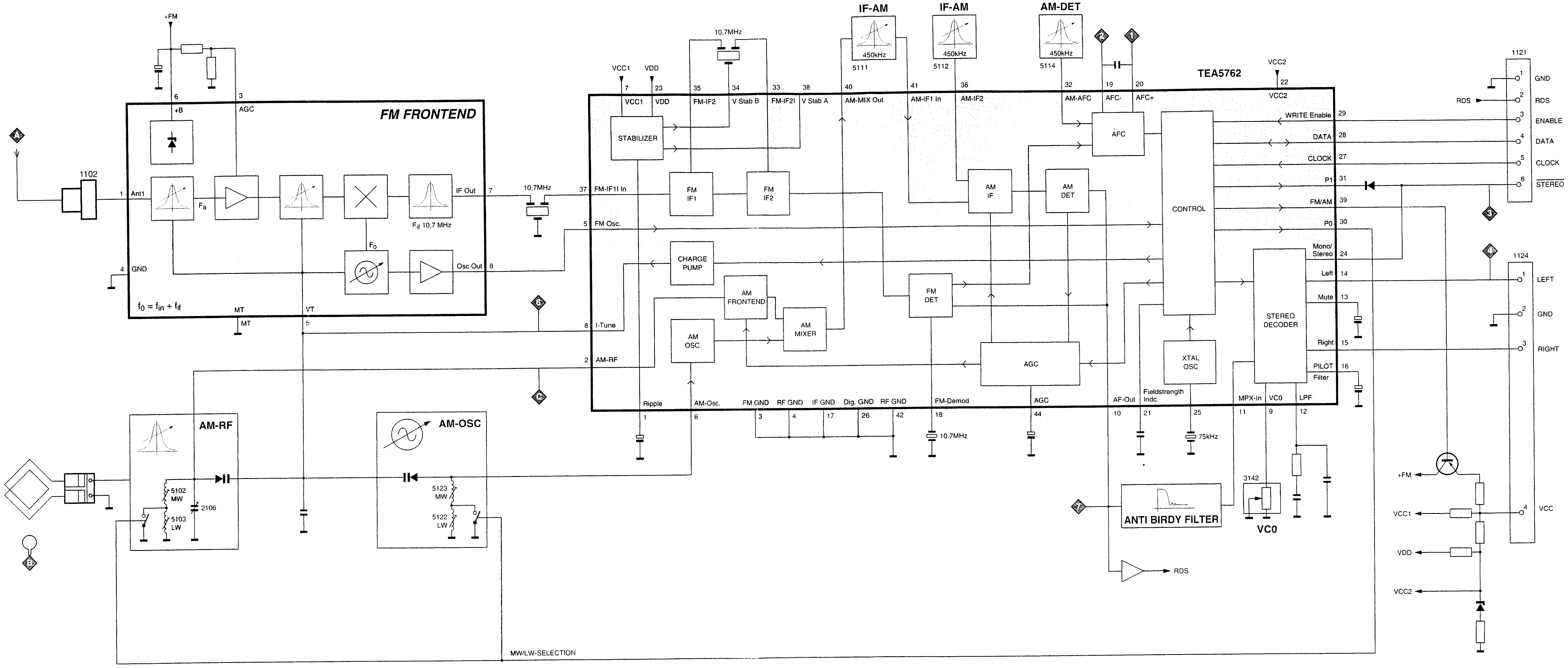
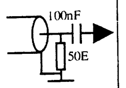
BLOCKDIAGRAM


+FM
6
3
+B
AGC
FM FRONTEND
A
1102
1 Ant1
Fa
IF Out 7
Fif 10,7 MHz
Fo
Osc Out 8
4 GND
f0 = fin + fif
MT
VT
MT
5
10,7MHz
10,7MHz
VCC1
VDD
7
23
35
34
33
38
40
41
36
32
19
20
22
VCC1
VDD
FM-IF2
V Stab B
FM-IF2I
V Stab A
AM-MIX Out
AM-IF1 In
AM-IF2
AM-AFC
AFC-
AFC+
VCC2
IF-AM
IF-AM
AM-DET
450kHz
450kHz
450kHz
5111
5112
5114
2
1
VCC2
TEA5762
STABILIZER
AFC
37 FM-IF1I In
FM IF1
FM IF2
AM IF
AM DET
CONTROL
5 FM Osc.
CHARGE PUMP
AM FRONTEND
FM DET
AM MIXER
AM OSC.
AGC
XTAL OSC
STEREO DECODER
8 I-Tune
2 AM-RF
6
6
WRITE Enable 29
DATA 28
CLOCK 27
P1 31
FM/AM 39
P0 30
Mono/Stereo 24
Left 14
Mute 13
Right 15
PILOT Filter 16
Ripple
AM-Osc.
FM GND
RF GND
IF GND
Dig. GND
RF GND
FM-Demod
AGC
AF-Out
Fieldstrength Indc.
MPX-In
VCO
LPF
1
6
3
4
17
26
42
18
44
10
21
25
11
9
12
10.7MHz
75kHz
1121
1
GND
RDS
2
RDS
3
ENABLE
4
DATA
5
CLOCK
6
STEREO
3
4
1124
1
LEFT
2
GND
3
RIGHT
AM-RF
5102 MW
5103 LW
2106
AM-OSC
5123 MW
5122 LW
B
C
7
ANTI BIRDY FILTER
3142
VCO
RDS
+FM
VCC1
VDD
VCC2
4
VCC
MW/LW-SELECTION

TUNER 95 bis Adjustment Table (FM, MW, LW with Frame antenna)

Waverange	Input frequency	Input	Set tuned to	Adjust	Output	Scope / Voltmeter
VARICAP ALIGNMENT						
FM (50) 87.5 - 108 MHz			108 MHz	check	◇6	7 ... 9V
			87.5 MHz	check		1.3 ... 2V
MW (9) 531 - 1602 kHz			1602 kHz	5123		8.3V ± 0.2V
			531 kHz	check		1V ± 0.4V
LW (3) 153 - 279 kHz			279 kHz	5122		8.3V ± 0.2V
			153 kHz	check		1V ± 0.4V
FM – DETECTION						
FM	98 MHz 1mV continuous wave ***short pin 21 (IC7101) to ground***	◇A	98 MHz	5107	◇1 ◇2	0mV ± 3mV
FM – VCO						
FM	98 MHz 1 mV continuous wave	◇A	98 MHz	3142	◇3	152kHz ± 1 kHz
DISTORTION						
FM	98 MHz 1 mV 90 % L + 9 % pilot mod = 1kHz	◇A	98MHz	mixcoil inside Tuner 1110	◇4	Distortion minimum
AM – IF						
MW	450kHz Δf = 10kHz Low as possible Swept signal		MW	5111	◇7	symmetrical and max. height ↕
				5112		
	450kHz continuous wave	◇C		5114	◇1 ◇2	0mV ± 2mV
AM - RF						
MW	558kHz Mod = 1kHz 30 % AM 1494 kHz	◇B	558kHz	5102	◇7	MAX ↕
			1494kHz	2106		
LW	198kHz mod = 1kHz 30 % AM	*	198kHz	5103		MAX

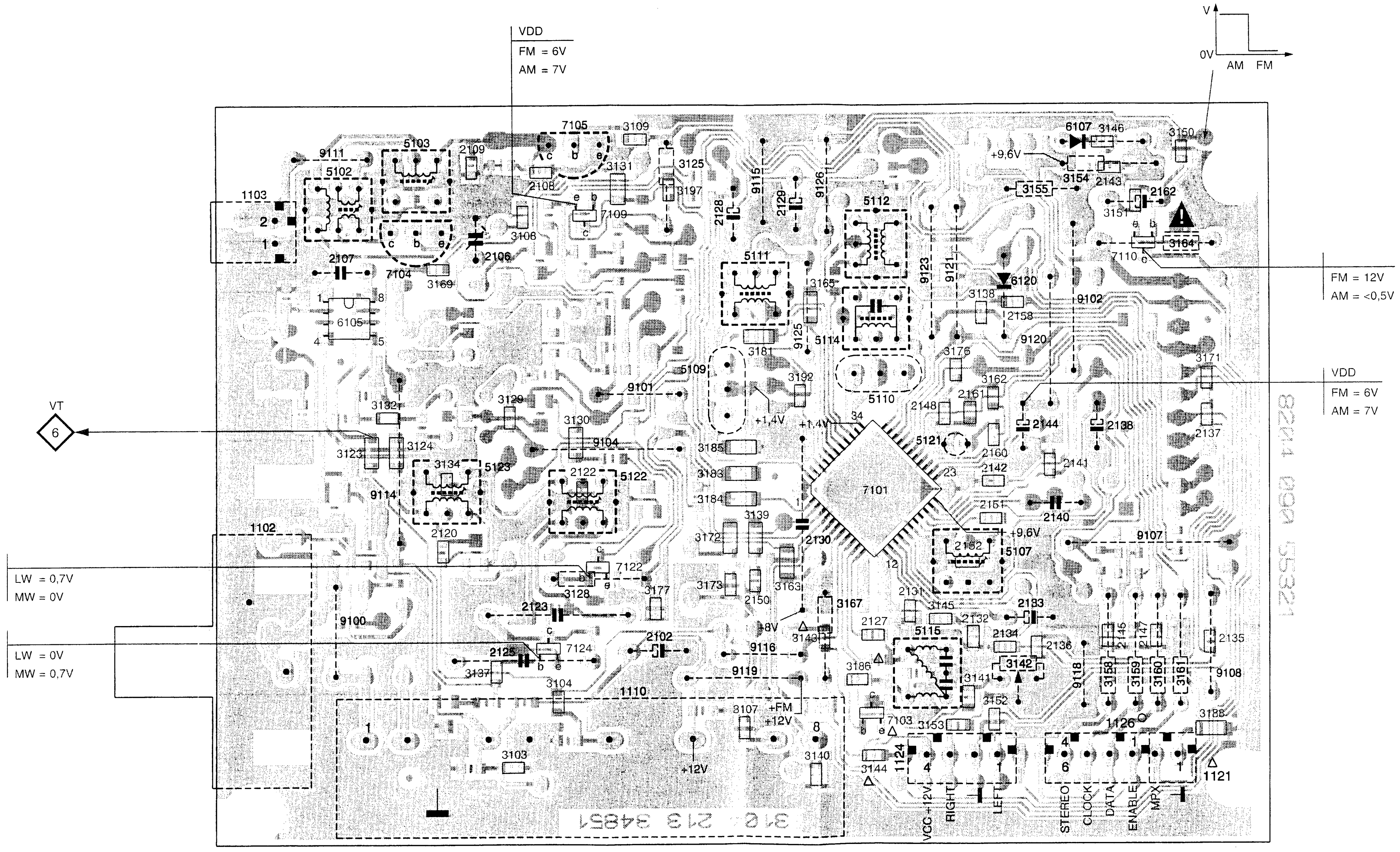
adjtable for 3104 217 04121/04341

* Signal send via a frame antenna
(..) = tuning grid in kHz

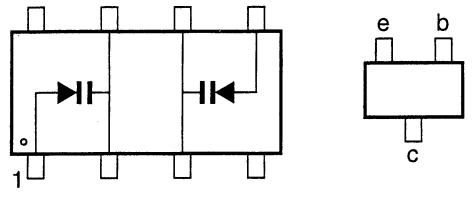
↕ repeat

1102	F4	2107	C4	2128	C7	2136	G10	2145	G11	2161	E9	3124	E5	3137	G5	3145	F9	3158	G11	3167	F8	3183	E7	5103	C5	5121	E9	7104	D5	9102	D10	9118	G10
1103	C3	2108	C6	2129	C8	2137	E11	2147	G11	2162	C11	3125	C7	3138	D9	3146	B10	3159	G11	3169	D5	3184	E7	5107	F10	5122	E7	7105	B6	9104	E6	9119	G7
1110	G7	2109	C5	2130	F8	2138	E10	2148	E9	3103	H6	3128	F6	3139	F8	3150	C11	3160	G11	3171	D11	3185	E7	5109	D7	5123	E5	7109	C6	9107	F11	9120	D10
1121	H11	2120	F5	2131	F9	2140	F10	2150	F8	3104	G6	3129	E6	3140	H8	3151	C10	3161	G11	3172	F7	3186	G8	5110	E9	6105	D4	7110	D11	9108	G11	9121	D9
1124	H9	2122	E6	2132	F9	2141	E10	2151	F9	3107	G7	3130	E6	3141	G9	3152	G9	3162	D9	3173	F7	3188	G11	5111	C8	6107	B10	7122	F7	9111	C4	9123	D9
1126	G10	2123	F6	2133	F10	2142	E9	2152	F9	3108	C6	3131	C6	3142	G10	3153	G9	3163	F8	3176	D9	3192	D8	5112	C9	6120	D10	7124	G6	9114	E5	9125	D8
2102	G7	2125	G5	2134	G10	2143	C10	2158	D10	3109	B7	3132	E5	3143	G8	3154	C10	3164	C11	3177	F7	3197	C7	5114	D8	7101	E9	9100	F4	9115	C8	9126	C8
2106	C5	2127	F9	2135	G11	2144	E10	2160	E9	3123	E4	3134	E5	3144	H8	3155	C10	3165	D8	3181	D8	5102	C4	5115	G9	7103	G9	9101	E7	9116	G8		

TUNER 95 bis Combi: Copper side view


1
2
3
4
5
6
7
8
9
10
11
12
13
A
B
C
D
E
F
G
H
I
J
VDD
FM = 6V
AM = 7V
V
0V
AM FM
FM = 12V
AM = <0,5V
VDD
FM = 6V
AM = 7V
VT
6
LW = 0,7V
MW = 0V
LW = 0V
MW = 0,7V
7105
3109
5103
9111
5102
1103
2109
3131
3125
3197
2108
7109
3108
2106
2107
7104
3169
6105
2128
9115
2129
9126
5112
5111
3165
6107
3146
3150
+9,6V
3154
2143
3155
3151
2162
7110
3164
9123
9121
6120
3138
2158
9102
9120
3181
9125
5114
5109
9101
3192
+1,4V
34
5110
3176
3162
2161
2148
2144
2138
3171
2137
3132
3129
3130
9104
3124
3123
3185
3183
3184
5121
2160
2142
2141
3134
5123
2122
5122
9114
7101
2151
2140
23
2120
3139
3172
2130
12
+9,6V
2132
5107
9107
1102
7122
3128
3177
3173
3163
2150
3167
2131
3145
2133
9100
2123
2127
2132
2134
2136
2135
2146
2147
7124
2125
2102
9116
+8V
3143
5115
3186
3142
3141
9118
3158
3159
3160
3161
9108
3137
3104
9119
1110
3152
3188
3107
+FM
+12V
3153
7103
1126
1
8
3103
+12V
3140
3144
1124
4
1121
6
VCC+12V
RIGHT
LEFT
STEREO
CLOCK
DATA
ENABLE
MPX
310 213 34851
8204 090 55321

IC 6105



△ only in RDS version (04121)

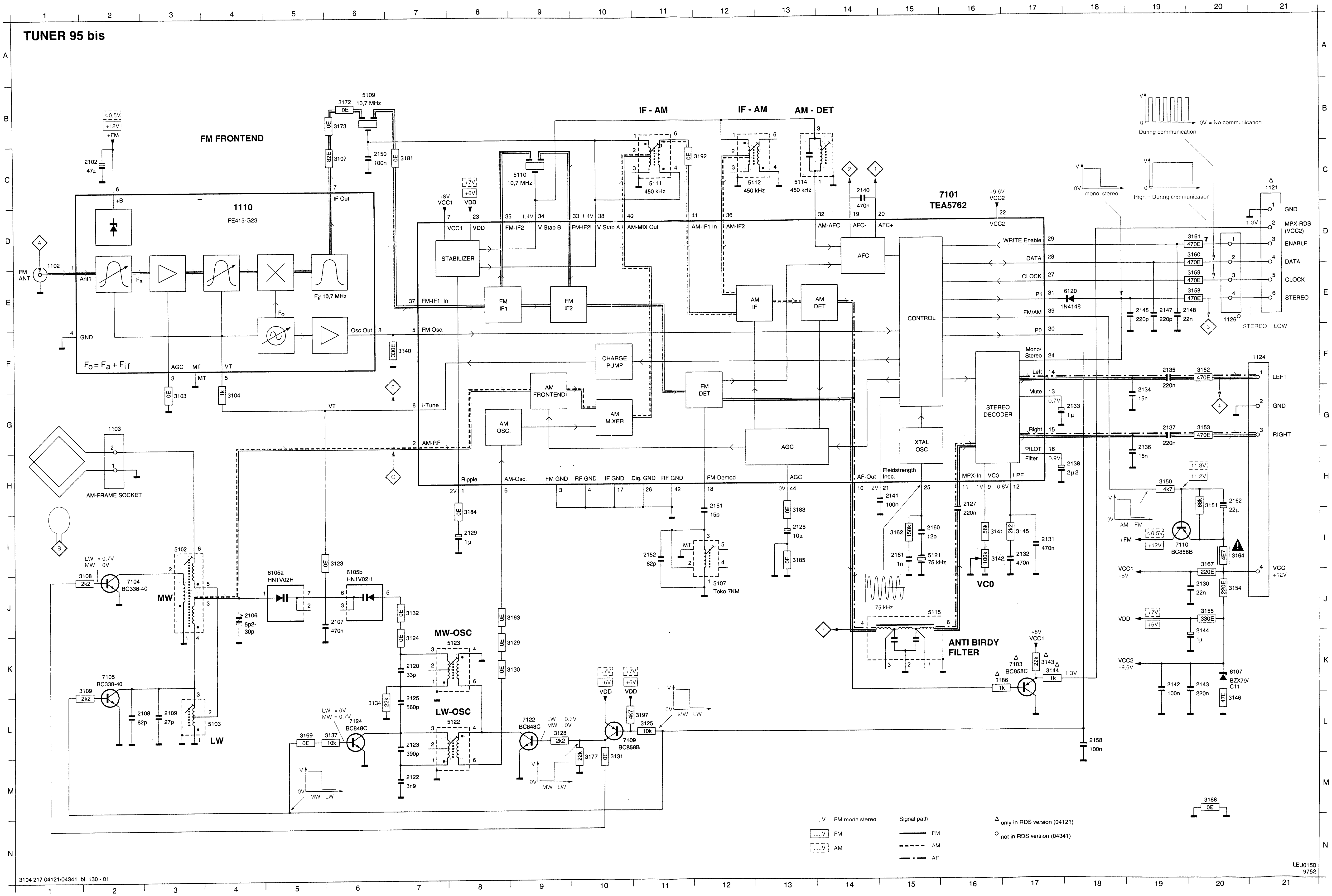
○ not in RDS version (04341)

TUNER 95 bis
3104 217 04121/04341 bl. 110 - 01

LEU0149
9751

1102	D1
1103	G2
1110	D4
1121	C21
1124	F21
1126	E20
2102	C2
2106	J4
2107	J6
2108	L2
2109	L3
2120	K7
2122	M7
2123	L7
2125	L7
2127	H16
2128	I13
2129	I8
2130	J20
2131	I17
2132	I17
2133	G18
2134	G19
2135	F19
2136	H19
2137	G19
2138	H18
2140	C14
2141	H15
2142	K19
2143	K20
2144	K20
2145	E19
2147	E19
2148	E19
2150	C6
2151	H12
2152	I11
2158	L18
2160	I15
2161	I15
2162	H20
3103	G3
3104	G4
3107	C6
3108	J1
3109	K1
3123	I6
3124	K7
3125	L11
3128	L9
3129	K8
3130	K8
3131	M10
3132	J7
3134	L6
3137	L5
3140	F7
3141	I16
3142	I16
3143	K17
3144	K17
3145	I17
3146	L20
3150	H19
3151	I20
3152	F20
3153	G20
3154	J20
3155	J20
3158	E19
3159	E19
3160	D19
3161	D19
3162	I15
3163	J8
3164	I20
3167	I20
3169	L5
3172	B6
3173	B6
3177	M10
3181	C7
3183	I13
3184	I8
3185	I13
3186	K16
3188	M20
3192	C12
3197	L11
5102	I3
5103	L4
5107	J12
5109	B6
5110	C9
5111	C11
5112	C12
5114	C13
5115	J15
5121	I15
5122	L7
5123	K7
6105a	I5
6105b	I6
6107	K20
6120	E17
7101	C15
7103	K17
7104	J2
7105	K2
7109	L10
7110	I19
7122	L9
7124	L6

TUNER 95 bis


FM FRONTEND
1110
FE415-G23
FM ANT.
Ant1
GND
+B
Fa
Fif 10,7 MHz
Fo
Fo = Fa + Fif
AGC
MT
VT
IF Out
Osc Out
+FM
<0,5V
+12V
2102 47µ
3103 0E
3104 1k
3107 82E
3173 0E
3172 0E
5109 10,7 MHz
2150 100n
3181 0E
3140 330E
AM-FRAME SOCKET
1103
1102
MW
LW
5102
5103
7104 BC338-40
7105 BC338-40
3108 2k2
3109 2k2
LW = 0,7V
MW = 0V
2106 5p2-30p
2108 82p
2109 27p
6105a HN1V02H
6105b HN1V02H
3123 0E
2107 470n
3132 0E
3124 0E
MW-OSC
5123
LW-OSC
5122
2120 33p
2125 560p
3134 22k
2123 390p
2122 3n9
3163 0E
3129 0E
3130 0E
3169 0E
3137 10k
7124 BC848C
7122 BC848C
3128 2k2
3177 22k
3131 0E
7109 BC858B
3197 4k7
3125 10k
VDD
+7V
+6V
MW LW
IF - AM
IF - AM
AM - DET
5110 10,7 MHz
5111 450 kHz
5112 450 kHz
5114 450 kHz
3192 0E
2140 470n
7101
TEA5762
+8V VCC1
VDD
+9,6V VCC2
VCC1
VDD
FM-IF2
V Stab B
FM-IF2I
V Stab A
AM-MIX Out
AM-IF1 In
AM-IF2
AM-AFC
AFC-
AFC+
VCC2
STABILIZER
FM-IF1I In
FM IF1
FM IF2
FM Osc.
CHARGE PUMP
AM FRONTEND
AM MIXER
AM OSC.
I-Tune
AM-RF
FM DET
AM IF
AM DET
AFC
AGC
CONTROL
XTAL OSC
STEREO DECODER
WRITE Enable
DATA
CLOCK
P1
FM/AM
P0
Mono/Stereo
Left
Mute
Right
PILOT Filter
Ripple
AM-Osc.
FM GND
RF GND
IF GND
Dig. GND
RF GND
FM-Demod
AGC
AF-Out
Fieldstrength Indc.
MPX-In
VCO
LPF
3184 0E
2129 1µ
2151 15p
2152 82p
5107 Toko 7KM
3183 0E
2128 10µ
3185 0E
2141 100n
3162 150k
2160 12p
2161 1n
5121 75 kHz
75 kHz
2127 220n
3141 56k
3142 100k
3145 2k2
2132 470n
2131 470n
VCO
5115
ANTI BIRDY FILTER
6120 1N4148
2145 220p
2147 220p
2148 22n
3161 470E
3160 470E
3159 470E
3158 470E
1126
STEREO = LOW
1121
GND
MPX-RDS (VCC2)
ENABLE
DATA
CLOCK
STEREO
1124
LEFT
GND
RIGHT
VCC +12V
2135 220n
3152 470E
2134 15n
2133 1µ
2137 220n
3153 470E
2136 15n
2138 2µ2
3150 4k7
3151 68k
2162 22µ
7110 BC858B
3164 4E7
3167 220E
2130 22n
3154 220E
3155 330E
2144 1µ
VCC1 +8V
VDD
VCC2 +9,6V
2142 100n
2143 220n
6107 BZX79/C11
3146 47E
7103 BC858C
3186 1k
3143 22k
3144 1k
2158 100n
3188 0E
mono stereo
AM FM
0V = No communication
During communication
High = During communication
....V FM mode stereo
FM
AM
Signal path
FM
AM
AF
only in RDS version (04121)
not in RDS version (04341)
3104 217 04121/04341 bl. 130 - 01
LEU0150 9752

ELECTRICAL PARTS LIST - TUNER 95 BOARD

MISCELLANEOUS

1102	4822 267 10283	Socket Coaxial IEC 75R
1103	4822 265 31184	JST Connector 2 pin
1110	4822 210 10739	Frontend Assembly FE415-G23

CAPACITORS

2102	4822 124 40433	47µF 20% 25V
2106	4822 125 60102	Trimmer 5,2-30pF 100V
2107	4822 121 51252	470nF 5% 63V
2108	4822 126 13695	82pF 1% 63V
2109	4822 126 13691	27pF 1% 63V
2120	5322 122 32659	33pF 5% 50V
2122	5322 126 10465	3,9nF 10% 63V
2125	4822 121 10578	560P 1% 630V
2127	4822 122 32927	220nF +80/-20% 50V
2128	4822 124 41579	10µF 20% 50V
2129	4822 124 40242	1µF 20% 63V
2130	4822 126 11585	22nF +80/-20% 25V
2131	4822 122 33325	470nF 16V
2132	4822 122 33325	470nF 16V
2133	4822 124 40242	1µF 20% 63V
2134	4822 126 13188	15nF 5% 63V
2135	4822 122 32927	220nF +80/-20% 50V
2136	4822 126 13188	15nF 5% 63V
2137	4822 122 32927	220nF +80/-20% 50V
2138	4822 124 41576	2,2µF 20% 50V
2140	4822 121 51252	470nF 5% 63V
2141	4822 122 31947	100nF 20% 63V
2142	4822 122 31947	100nF 20% 63V
2143	4822 122 32927	220nF +80/-20% 50V
2144	4822 124 40242	1µF 20% 63V
2145	4822 122 33575	220pF 5% 50V
2147	4822 122 33575	220pF 5% 50V
2148	4822 122 33809	22nF 20% 50V
2150	4822 122 31947	100nF 20% 63V
2151	4822 126 14236	50V 15pF 5%
2152	4822 126 13695	82pF 1% 63V
2158	4822 122 31947	100nF 20% 63V
2160	4822 122 32139	12pF 2% 63V
2161	5322 122 34123	1nF 10% 50V
2162	4822 124 81151	22µF 50V

RESISTORS

3103	4822 051 20008	0R Jumper 0805
3104	4822 051 10102	1k 2% 0,25W
3107	4822 051 20829	82R 5% 0,1W
3108	4822 117 11449	2k2 1% 0,1W
3109	4822 117 11449	2k2 1% 0,1W
3123	4822 051 10008	0R 5% 0,25W
3124	4822 051 10008	0R 5% 0,25W
3125	4822 116 83864	10k 5% 0,5W
3128	4822 116 52256	2k2 5% 0,5W
3129	4822 051 20008	0R Jumper 0805
3130	4822 051 10008	0R 5% 0,25W
3131	4822 051 10008	0R 5% 0,25W
3132	4822 051 20008	0R Jumper 0805
3134	4822 051 20223	22k 5% 0,1W
3137	4822 117 10833	10k 1% 0,1W
3138	4822 051 20008	0R Jumper 0805
3139	4822 051 10008	0R 5% 0,25W
3140	4822 051 20331	330R 5% 0,1W
3141	4822 051 20563	56k 5% 0,1W
3142	4822 100 11163	Trimmer 100k 30% 0,1W
3143	4822 051 20223	22k 5% 0,1W
3144	4822 051 10102	1k 2% 0,25W
3145	4822 117 11449	2k2 1% 0,1W
3146	4822 051 20479	47R 5% 0,1W
3150	4822 051 20472	4k7 5% 0,1W
3151	4822 051 20683	68k 5% 0,1W
3152	4822 051 20471	470R 5% 0,1W
3153	4822 051 20471	470R 5% 0,1W
3154	4822 116 83872	220R 5% 0,5W
3155	4822 116 52219	330R 5% 0,5W
3158	4822 116 83883	470R 5% 0,5W
3159	4822 116 83883	470R 5% 0,5W
3160	4822 116 83883	470R 5% 0,5W
3161	4822 116 83883	470R 5% 0,5W
3162	4822 051 20224	220k 5% 0,1W
3163	4822 051 10008	0R 5% 0,25W
3164	4822 052 10478 ⚠	4R7 5% 0,33W
3165	4822 051 10008	0R 5% 0,25W
3167	4822 116 83872	220R 5% 0,5W
3169	4822 051 20008	0R Jumper 0805
3171	4822 051 20008	0R Jumper 0805
3172	4822 051 10008	0R 5% 0,25W
3173	4822 051 20008	0R Jumper 0805
3176	4822 051 20008	0R Jumper 0805
3177	4822 051 20223	22k 5% 0,1W
3181	4822 051 10008	0R 5% 0,25W
3183	4822 051 10008	0R 5% 0,25W
3184	4822 051 10008	0R 5% 0,25W
3185	4822 051 10008	0R 5% 0,25W
3186	4822 051 10102	1k 2% 0,25W
3188	4822 051 10008	0R 5% 0,25W
3192	4822 051 20008	0R Jumper 0805
3197	4822 051 20472	4k7 5% 0,1W

COILS & FILTERS

5102	4822 157 71634	MW AERIAL
5103	4822 157 71635	LW AERIAL
5107	4822 157 11443	FM Discriminator 10,7MHz
5109	4822 157 71639	Ceram Filter 10,7MHz
5110	4822 242 70665	Ceram Filter 10,7MHz
5111	4822 158 60511	AM-IF Filter 450kHz
5112	4822 157 70302	AM-IF Filter 450kHz

ELECTRICAL PARTS LIST - TUNER 95 BOARD

5114	4822 157 70302	AM-IF Filter 450kHz
5115	4822 157 71636	Anti-Birdy Filter
5121	4822 242 10261	X'tal Resonator 75kHz
5122	4822 157 60517	RF Coil AM
5123	4822 157 60517	RF Coil AM

DIODES

6105	4822 130 83075	HN1V02H-B
6107	4822 130 34488	BZX79-B11
6120	4822 130 30621	1N4148

TRANSISTORS & INTEGRATED CIRCUITS

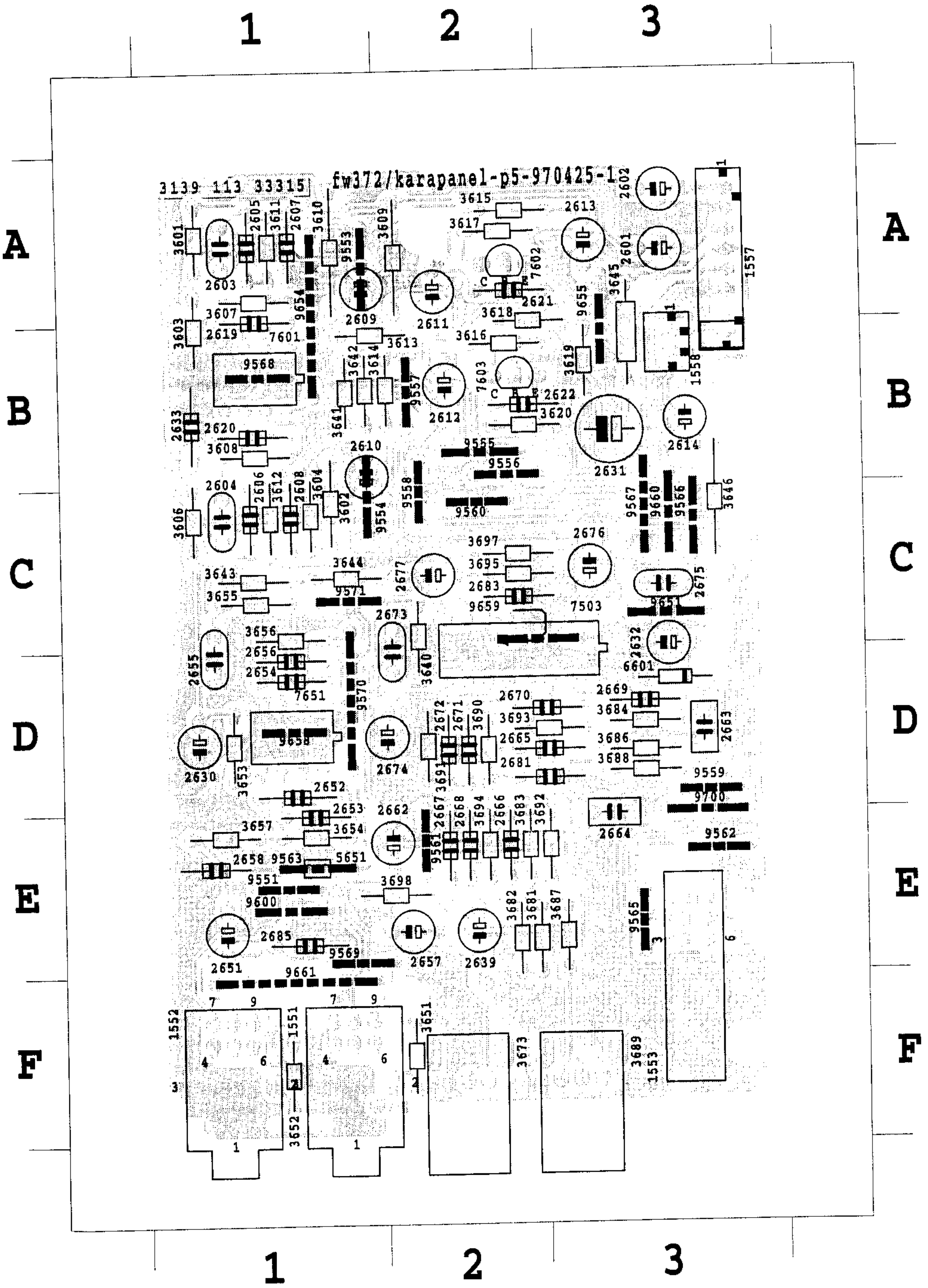
7101	4822 209 90315	TEA5762H/V1
7103	4822 130 42513	BC858C
7104	5322 130 44779	BC338-40
7105	5322 130 44779	BC338-40
7109	5322 130 41983	BC858B
7110	5322 130 41983	BC858B
7122	5322 130 42136	BC848C
7124	5322 130 42136	BC848C

Note: Only the parts mentioned in this list are normal service spare parts.

KARAOKE BOARD

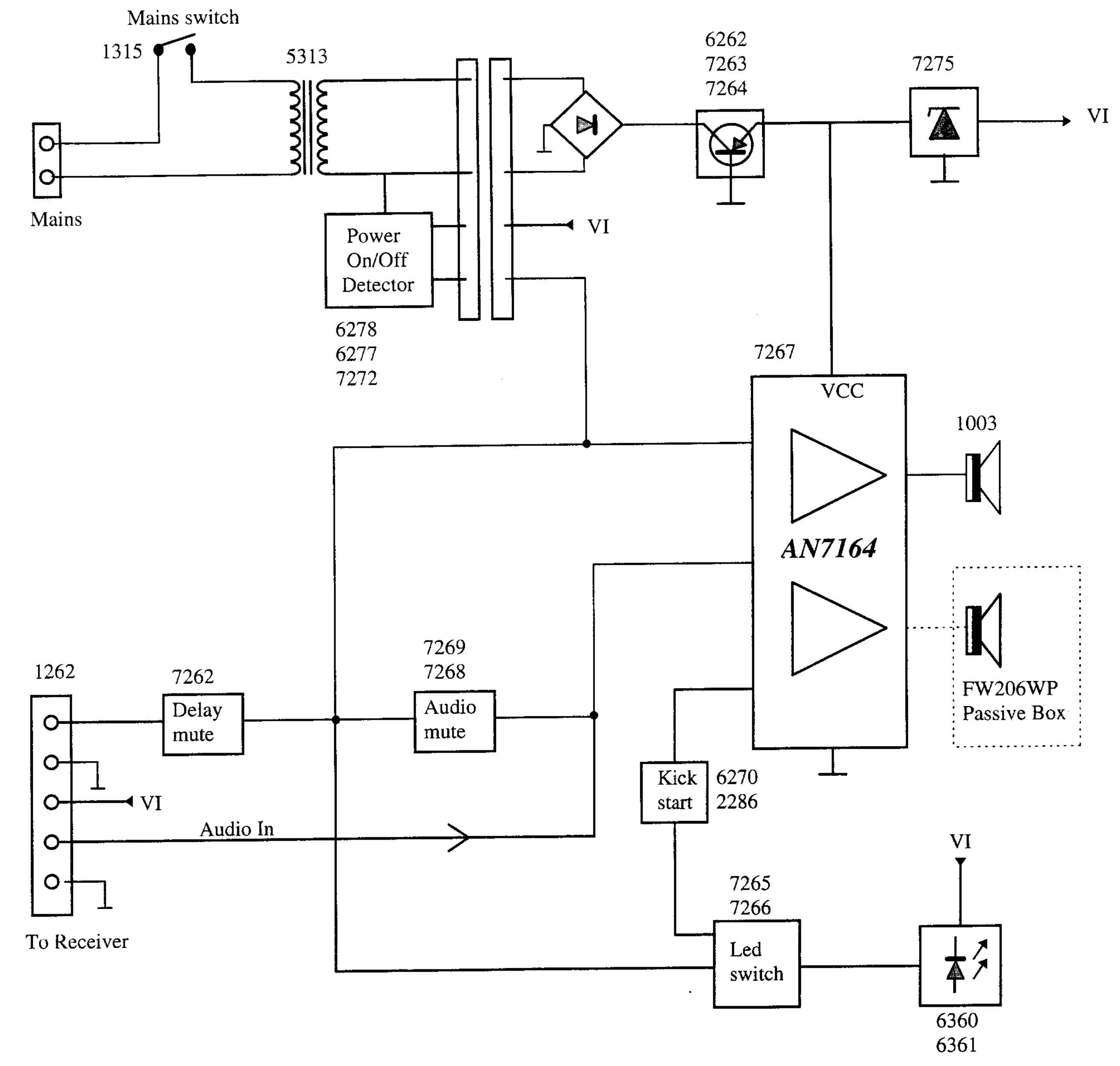
Component Layout .... 8 - 2
Circuit Diagram .... 8 - 3
Partlist .... 8 - 4

COMPONENT LAYOUT



1551	F	1
1552	F	1
1553	E	3
1557	A	3
1558	B	3
2601	A	3
2602	A	3
2603	A	1
2604	C	1
2605	A	1
2606	C	1
2607	A	1
2608	C	1
2609	A	1
2610	B	1
2611	A	2
2612	B	2
2613	A	3
2614	B	3
2619	A	1
2620	B	1
2621	A	2
2622	B	2
2630	D	1
2631	B	3
2632	C	3
2633	B	1
2639	E	2
2651	E	1
2652	D	1
2653	E	1
2654	D	1
2655	D	1
2656	D	1
2657	E	2
2658	E	1
2662	E	2
2663	D	3
2664	E	3
2665	D	3
2666	E	2
2667	E	2
2668	E	2
2669	D	3
2670	D	3
2671	D	2
2672	D	2
2673	D	2
2674	D	2
2675	C	3
2676	C	3
2677	C	2
2681	D	3
2683	C	2
2685	E	1
3601	A	1
3602	C	1
3603	B	1
3604	C	1
3606	C	1
3607	A	1
3608	B	1
3609	A	2
3610	A	1
3611	A	1
3612	C	1
3613	B	1
3614	B	2
3615	A	2
3616	B	2
3617	A	2
3618	B	2
3619	B	3
3620	B	2
3640	C	2
3641	B	1
3642	B	1
3643	C	1
3644	C	1
3645	B	3
3646	C	3
3651	F	2
3652	F	1
3653	D	1
3654	E	1
3655	C	1
3656	C	1
3657	E	1
3673	F	2
3681	E	2
3682	E	2
3683	E	2
3684	D	3
3686	D	3
3687	E	3
3688	D	3
3689	F	3
3690	D	2
3691	D	2
3692	E	3
3693	D	3
3694	E	2
3695	C	2
3697	C	2
3698	E	2
5651	E	1
6601	D	3
7503	D	2
7601	B	1
7602	A	2
7603	B	2
7651	D	1
9551	E	1
9553	A	1
9554	C	1
9555	B	2
9556	B	2
9557	B	2
9558	C	2
9559	D	3
9560	C	2
9561	E	2
9562	E	3
9563	E	1
9565	E	3
9566	C	3
9567	C	3
9568	B	1
9569	E	1
9570	D	1
9571	C	1
9600	E	1
9651	C	3
9654	A	1
9655	B	3
9658	D	1
9659	C	2
9660	C	3
9661	F	1
9700	E	3

Block Diagram Amplifier



POWER CIRCUIT DESCRIPTION

1- Secondary supply circuitry.

Main components : 2265, 2267, 2263, 2299, 7263 and 7264
This circuitry rectifies and filters the AC secondary voltage. A limiter 7263 7264 is placed in series to limit the output voltage to 25V to protect the power amplifier in overvoltage in case of no or light load. At high load, the limiting transistor 7263 is in saturation as the rectified voltage is lower than 25 V.

2- Amplifier.

Main components : 7267, 2286, 2281, 2283, 2282, 2285
The power amplifier IC 7267 is composed of two amplifiers connected in bridge. The outputs deliver power to two 3 Ohms loads connected in series. The amplifier is able to output 18 W in each speaker. A capacitor 2282 is placed in their middle point to allow the system to work with only one speaker (but with reduced performances). The feed-back network is composed of internal resistors and components 2285 3295 between pins I/P1- and I/P2-. A Boucherot network 2275-3293,2276-3294 is placed on both outputs.

3- Amplifier stand-by input.

Main components : 3292, 2284, 6269
These components provide a fast enabling of the amplifier and a slow disabling to ensure plop-free transitions.

4- Amplifier kick start.

Main components : 6270, 2274, 3296, 3297, 3298
This components provide a kick start for the amplifier in case it does not start automatically This circuitry precharges the ripple capacitor 2286.

5- Output capacitor precharger.

Main components : 6265, 3264, 3265
This circuitry precharges the output capacitor 2282 to about 1V to avoid plops at switch on and off.

6- Auxiliary power supply. (+12V)

Main components : 6260, 7275, 2262, 2261
A regulated 7275+12V supply is used to power the receiver circuitry, the mute delay circuitry, the power On/Off detector and the Led driver. It can deliver a current of 120 mA in normal operation.
The regulated supply is derived from the amplifier supply :
- to discharge the large Elcos
- to satisfy the mains failure test
- to provide power to the control circuitry until the amplifier is muted at power down

7- Power On/Off detector.

Main components : 6277, 6278, 7272
This circuitry provides an initial delay of 2 seconds at power on 2294, 3309 by turning on the transistor 7272 to allow all the power supplies to be stable (to avoid amplifier breakdown). It is then reset at every mains cycle, thus keeping the transistor off. At power down, the transistor 7272 is again turned on to issue the stand-by command. A delay is necessary to avoid unwanted pauses during acceptable mains drops (<100 ms).

8- Audio signal.

Main components : 7268, 7269
These few components interface the signal given by the receiver to the amplifier (signal level, filter).An audio mute is also provided at power up and down to remove any plop and to protect the amplifier.

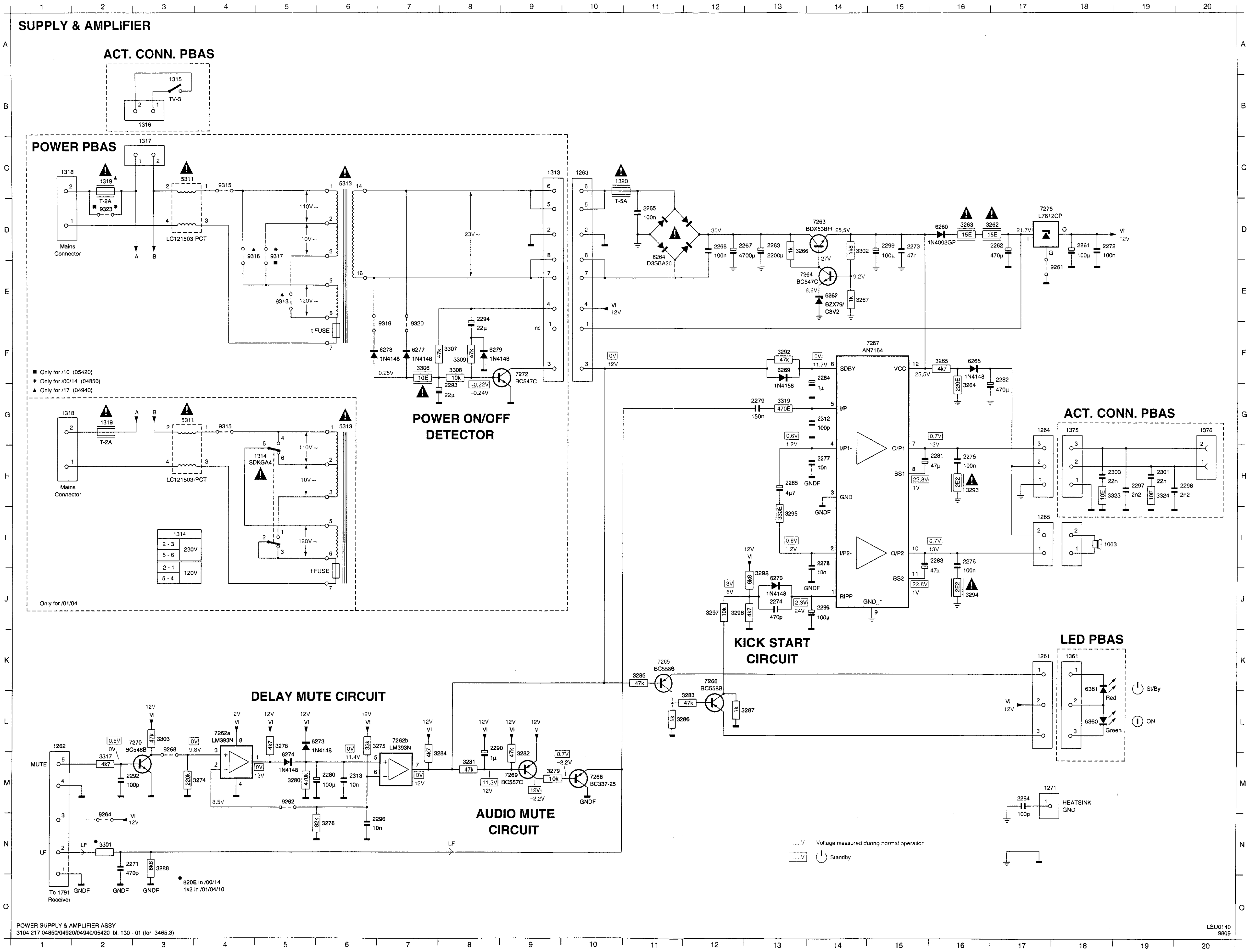
9- Stand-by delay.

Main components : 7270, 7262, 2280
This circuitry delays the mute signal coming from the receiver by 15 seconds. This is to avoid the amplifier to be muted every time a perturbation occurs in the transmission link.

10- Leds driver.

Main components : 7265, 7266, 6360, 6361
This circuitry turns on or off two leds. The green led indicates nominal operation (amplifier enabled) while the red led indicates the amplifier being in mute state.

SUPPLY & AMPLIFIER

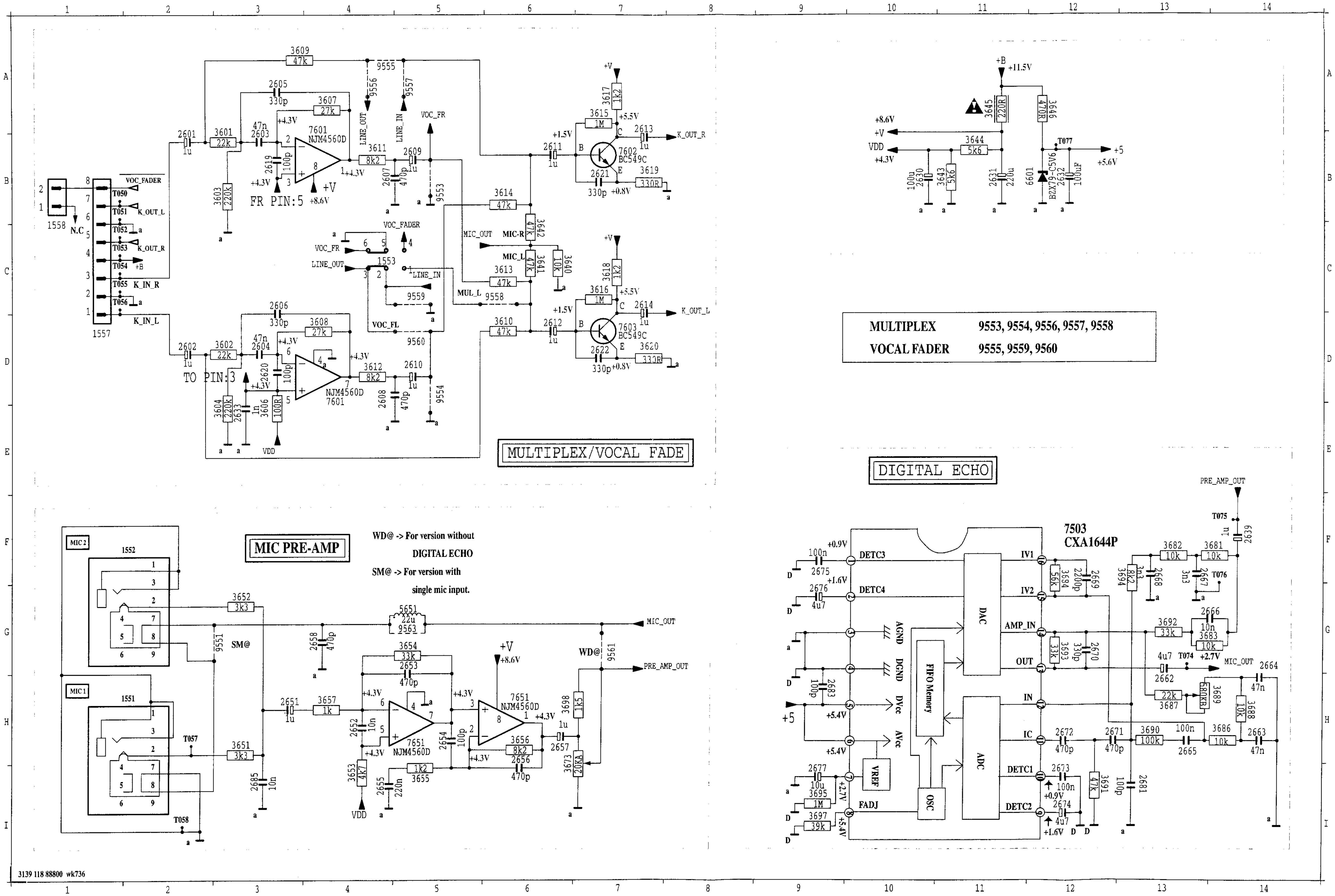

ACT. CONN. PBAS
1315
TV-3
1316
POWER PBAS
1317
1318
1319
T-2A
9323
5311
LC121503-PCT
9315
5313
110V ~
10V ~
120V ~
9316
9317
9313
t FUSE
Mains Connector
A
B
■ Only for /10 (05420)
✱ Only for /00/14 (04850)
▲ Only for /17 (04940)
1314
SDKGA4
Only for /01/04
1313
23V ~
9319
9320
6278
1N4148
6277
1N4148
3307
47k
3306
10E
3308
10k
3309
47k
6279
1N4148
2293
22µ
2294
22µ
7272
BC547C
+0.22V
-0.24V
-0.25V
POWER ON/OFF DETECTOR
1263
1320
T-5A
2265
100n
6264
D3SBA20
30V
2266
100n
2267
4700µ
2263
2200µ
3266
1k
7263
BDX53BFI
25.5V
27V
7264
BC547C
8.6V
9.2V
6262
BZX79/C8V2
3267
1k
3302
1k8
2299
100µ
2273
47n
6260
1N4002GP
3263
15E
3262
15E
2262
470µ
21.7V
7275
L7812CP
I
O
G
9261
2261
100µ
2272
100n
VI
12V
7267
AN7164
SDBY
VCC
I/P
I/P1-
I/P2-
O/P1
O/P2
BS1
BS2
GND
RIPP
GND_1
3292
47k
6269
1N4158
2284
1µ
11.7V
2279
150n
3319
470E
2312
100p
2277
10n
2285
4µ7
3295
330E
2278
10n
3298
6k8
6270
1N4148
2274
470p
2286
100µ
3297
10k
3296
4k7
3265
4k7
6265
1N4148
3264
220E
2282
470µ
2281
47µ
2275
100n
3293
2E2
2283
47µ
2276
100n
3294
2E2
22.8V
13V
KICK START CIRCUIT
ACT. CONN. PBAS
1264
1375
1376
2300
22n
3323
10E
2297
2n2
2301
22n
3324
10E
2298
2n2
1265
1003
LED PBAS
1261
1361
6361
Red
6360
Green
St/By
ON
1271
2264
100p
HEATSINK GND
7265
BC558B
3285
47k
7266
BC558B
3283
47k
3286
1k
3287
1k
DELAY MUTE CIRCUIT
1262
MUTE
LF
To 1791 Receiver
3317
4k7
2292
100p
7270
BC548B
3303
47k
9268
3274
220k
7262a
LM393N
3275
4k7
6274
1N4148
6273
1N4148
3280
470k
2280
100µ
2313
10n
9262
3276
82k
2296
10n
3278
33k
7262b
LM393N
3284
4k7
3281
47k
2290
1µ
3282
47k
7269
BC557C
3279
10k
7268
BC337-25
AUDIO MUTE CIRCUIT
9264
3301
2271
470p
3288
6k8
GNDF
● 820E in /00/14
1k2 in /01/04/10
.....V Voltage measured during normal operation
.....V Standby

POWER SUPPLY & AMPLIFIER ASSY
3104 217 04850/04920/04940/05420 bl. 130 - 01 (for 3465.3)

LEU0140
9809

1003	I18	7275	D17
1261	K17	9261	E17
1262	L1	9262	M5
1263	C10	9264	N2
1264	G17	9268	L3
1265	I17	9313	E5
1271	M17	9315	G4
1313	C9	9315	C4
1314	H4	9316	D4
1315	B3	9317	D5
1316	B3	9319	F6
1317	C3	9320	F7
1318	G1	9323	D2
1318	C1		
1319	G2		
1319	C2		
1320	C10		
1361	K18		
1375	G18		
1376	G20		
2261	D18		
2262	D16		
2263	D13		
2264	M17		
2265	D11		
2266	D12		
2267	D12		
2271	N2		
2272	D18		
2273	D15		
2274	J13		
2275	H16		
2276	I16		
2277	H14		
2278	I14		
2279	G13		
2280	M6		
2281	H16		
2282	F17		
2283	I16		
2284	F14		
2285	H13		
2286	J14		
2290	L8		
2292	M2		
2293	G8		
2294	E8		
2296	N6		
2297	H19		
2298	H20		
2299	D15		
2300	H18		
2301	H19		
2312	G14		
2313	M6		
3262	D16		
3263	D16		
3264	G16		
3265	F16		
3266	D13		
3267	E14		
3274	M3		
3275	L6		
3276	N6		
3278	L5		
3279	M9		
3280	M5		
3281	M8		
3282	M9		
3283	L11		
3284	M7		
3285	K11		
3286	L11		
3287	L12		
3288	N3		
3292	F13		
3293	H16		
3294	J16		
3295	I13		
3296	J12		
3297	J12		
3298	J13		
3301	N2		
3302	D14		
3303	L3		
3306	F7		
3307	F8		
3308	F8		
3309	F8		
3317	M2		
3319	G13		
3323	H18		
3324	H19		
5311	G3		
5311	C3		
5313	G6		
5313	C6		
6260	D16		
6262	E14		
6264	D11		
6265	F16		
6269	F13		
6270	J13		
6273	L5		
6274	M5		
6277	F7		
6278	F7		
6279	F8		
6360	L18		
6361	L18		
7262a	L4		
7262b	L7		
7263	D14		
7264	E13		
7265	K11		
7266	K12		
7267	F14		
7268	M10		
7269	M9		
7270	L2		
7272	F9		

KARAOKE CIRCUIT


MULTIPLEX/VOCAL FADE
DIGITAL ECHO
MIC PRE-AMP
WD@ -> For version without DIGITAL ECHO
SM@ -> For version with single mic input.
MULTIPLEX 9553, 9554, 9556, 9557, 9558
VOCAL FADER 9555, 9559, 9560
7503 CXA1644P
NJM4560D
BC549C
FIFO Memory
DAC
ADC
VREF
OSC
MIC_OUT
PRE_AMP_OUT
K_OUT_R
K_OUT_L
K_IN_R
K_IN_L
VOC_FADER
LINE_OUT
LINE_IN
MIC1
MIC2
3139 118 88800 wk736

1551	H 2
1552	F 2
1553	C 4
1557	D 1
1558	B 1
2601	B 2
2602	D 2
2603	B 3
2604	D 3
2605	A 3
2606	C 3
2607	B 4
2608	D 4
2609	B 5
2610	D 5
2611	B 6
2612	D 6
2613	A 7
2614	C 7
2619	B 3
2620	D 3
2621	B 7
2622	D 7
2630	B10
2631	B11
2632	B12
2633	E 3
2639	F14
2651	H 3
2652	H 4
2653	G 5
2654	H 5
2655	I 4
2656	H 6
2657	H 6
2658	G 4
2662	H13
2663	H14
2664	G14
2665	H13
2666	G14
2667	F13
2668	F13
2669	F12
2670	G12
2671	H12
2672	H12
2673	I12
2674	I12
2675	F 9
2676	G 9
2677	I 9
2681	I13
2683	H 9
2685	I 3
3601	B 3
3602	D 3
3603	B 3
3604	E 3
3606	E 3
3607	A 4
3608	D 4
3609	A 3
3610	D 6
3611	B 4
3612	D 4
3613	C 6
3614	B 6
3615	A 7
3616	C 7
3617	A 7
3618	C 7
3619	B 7
3620	D 7
3640	C 6
3641	C 6
3642	C 6
3643	B11
3644	B11
3645	A11
3646	A12
3651	H 3
3652	G 3
3653	I 4
3654	G 5
3655	I 5
3656	H 6
3657	H 4
3673	H 6
3681	F14
3682	F13
3683	G13
3684	F12
3686	H14
3687	H13
3688	H14
3689	H14
3690	H13
3691	I12
3692	G13
3693	G12
3694	F12
3695	I 9
3697	I 9
3698	H 6
5651	G 5
6601	B12
7503	F12
7601	A 4
7601	D 4
7602	B 7
7603	D 7
7651	H 6
7651	H 5
9551	G 2
9553	B 5
9554	D 5
9555	A 4
9556	A 4
9557	A 5
9558	C 6
9559	C 5
9560	D 5
9561	G 7
9563	G 5

ELECTRICAL PARTS LIST - KARAOKE BOARD

MISCELLANEOUS

1551	4822 267 40898	Mic Socket
1552	4822 267 40898	Mic Socket
1553	4822 276 12571	Vocal Fader Switch

CAPACITORS

2601	4822 124 40242	1μF 20% 63V
2602	4822 124 40242	1μF 20% 63V
2603	4822 121 43526	47nF 5% 250V
2604	4822 121 43526	47nF 5% 250V
2605	4822 126 12787	330pF 10% 50V
2606	4822 126 12787	330pF 10% 50V
2607	4822 122 33519	470pF 10% 50V
2608	4822 122 33519	470pF 10% 50V
2609	4822 124 40242	1μF 20% 63V
2610	4822 124 40242	1μF 20% 63V
2611	4822 124 40242	1μF 20% 63V
2612	4822 124 40242	1μF 20% 63V
2613	4822 124 40242	1μF 20% 63V
2614	4822 124 40242	1μF 20% 63V
2619	4822 122 33195	100pF 10% 50V
2620	4822 122 33195	100pF 10% 50V
2621	4822 126 12787	330pF 10% 50V
2622	4822 126 12787	330pF 10% 50V
2630	4822 124 41584	100μF 20% 10V
2631	4822 124 22263	220μF 20% 25V
2632	4822 124 41584	100μF 20% 10V
2633	4822 122 33197	1nF 10% 50V
2639	4822 124 40242	1μF 20% 63V
2651	4822 124 40242	1μF 20% 63V
2652	4822 121 51387	10nF 20% 16V
2653	4822 122 33519	470pF 10% 50V
2654	4822 122 33195	100pF 10% 50V
2655	4822 121 42408	220nF 5% 63V
2656	4822 122 33519	470pF 10% 50V
2657	4822 124 40242	1μF 20% 63V
2658	4822 122 33519	470pF 10% 50V
2662	4822 124 40246	4,7μF 20% 63V
2663	4822 121 43526	47nF 5% 250V
2664	4822 121 43526	47nF 5% 250V
2665	4822 126 12882	100nF +80-20% 50V
2666	4822 121 51387	10nF 20% 16V
2667	4822 122 10577	3,3nF 10% 16V
2668	4822 122 10577	3,3nF 10% 16V
2669	4822 126 12339	2200pF 10%
2670	4822 126 12787	330pF 10% 50V
2671	4822 122 33519	470pF 10% 50V
2672	4822 122 33519	470pF 10% 50V
2673	5322 121 42386	100nF 5% 63V
2674	4822 124 40246	4,7μF 20% 63V
2675	5322 121 42386	100nF 5% 63V
2676	4822 124 40246	4,7μF 20% 63V
2677	4822 124 41579	10μF 20% 50V
2681	4822 122 33195	100pF 10% 50V
2683	4822 122 33195	100pF 10% 50V
2685	4822 121 51387	10nF 20% 16V

RESISTORS

3601	4822 116 52257	22k 5% 0,5W
3602	4822 116 52257	22k 5% 0,5W
3603	4822 116 83874	220k 5% 0,5W
3604	4822 116 83874	220k 5% 0,5W
3606	4822 116 52175	100R 5% 0,5W
3607	4822 116 52264	27k 5% 0,5W
3608	4822 116 52264	27k 5% 0,5W
3609	4822 116 83884	47k 5% 0,5W
3610	4822 116 83884	47k 5% 0,5W
3611	4822 116 52303	8k2 5% 0,5W
3612	4822 116 52303	8k2 5% 0,5W
3613	4822 116 83884	47k 5% 0,5W
3614	4822 116 83884	47k 5% 0,5W
3615	4822 116 52235	1M 5% 0,5W
3616	4822 116 52235	1M 5% 0,5W
3617	4822 116 52207	1k2 5% 0,5W
3617	4822 116 52249	1k8 5% 0,5W (DPL version)
3618	4822 116 52207	1k2 5% 0,5W
3618	4822 116 52249	1k8 5% 0,5W (DPL version)
3619	4822 116 52219	330R 5% 0,5W
3619	4822 116 83883	470R 5% 0,5W (DPL version)
3620	4822 116 52219	330R 5% 0,5W
3620	4822 116 83883	470R 5% 0,5W (DPL version)
3640	4822 116 83864	10k 5% 0,5W
3641	4822 116 83884	47k 5% 0,5W
3642	4822 116 83884	47k 5% 0,5W
3643	4822 116 52289	5k6 5% 0,5W
3644	4822 116 52289	5k6 5% 0,5W
3645	4822 052 10221 ⚠	220R 5% 0,33W
3646	4822 116 83883	470R 5% 0,5W
3651	4822 116 52269	3k3 5% 0,5W
3652	4822 116 52269	3k3 5% 0,5W
3653	4822 116 52283	4k7 5% 0,5W
3654	4822 116 52271	33k 5% 0,5W
3655	4822 116 52207	1k2 5% 0,5W
3656	4822 116 52303	8k2 5% 0,5W
3656	4822 116 52264	27k 5% 0,5W (DPL version)
3657	4822 050 11002	1k 1% 0,4W
3673	4822 101 21204	Potm Rotary 20kB
3681	4822 116 83864	10k 5% 0,5W
3682	4822 116 83864	10k 5% 0,5W
3683	4822 116 83864	10k 5% 0,5W
3684	4822 116 52291	56k 5% 0,5W
3686	4822 116 83864	10k 5% 0,5W
3687	4822 116 83884	47k 5% 0,5W
3688	4822 116 83864	10k 5% 0,5W
3689	4822 101 11326	Potm Rotary 500k

3690	4822 116 52234	100k 5% 0,5W
3691	4822 116 83884	47k 5% 0,5W
3692	4822 116 52271	33k 5% 0,5W
3693	4822 116 52271	33k 5% 0,5W
3694	4822 116 52303	8k2 5% 0,5W
3695	4822 116 52235	1M 5% 0,5W
3697	4822 116 83882	39k 5% 0,5W
3698	4822 116 52243	1k5 5% 0,5W

COILS

5651	4822 157 52983	COIL 22μH

DIODES

6601	4822 130 34173	BZX79-C5V6

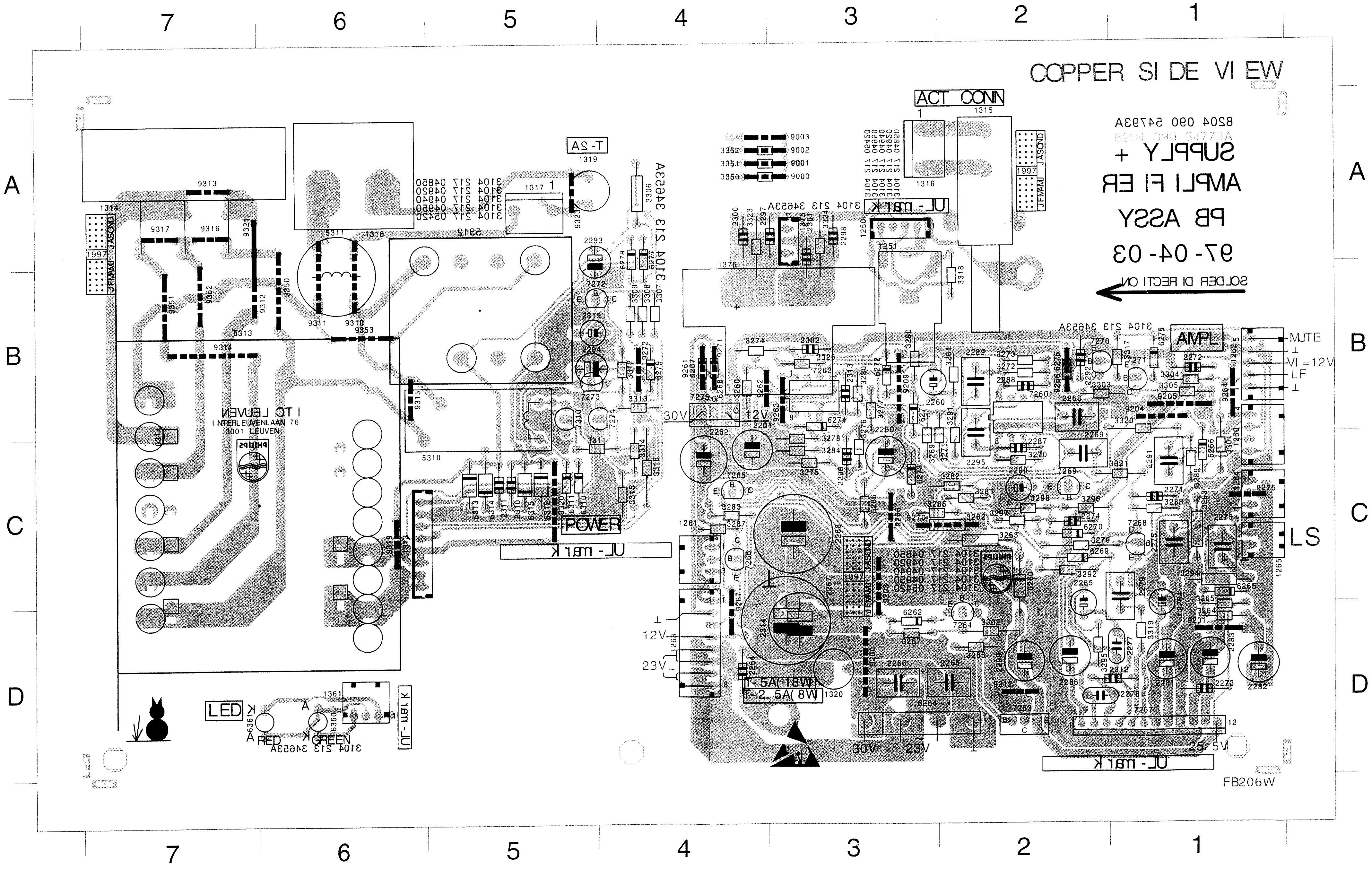
TRANSISTORS & INTEGRATED CIRCUITS

7503	4822 209 33717	CXA1644P
7601	4822 209 83274	NJM4560D
7602	4822 130 41096	BC550C
7603	4822 130 41096	BC550C
7651	4822 209 83274	NJM4560D

NOTE: Only the parts mentioned in this list are normal service spare parts.

POWER &AMPLIFIER BOARD Copper side view

1315 A 2	9319 C 6	7274 B 4	6277 A 4	3307 B 4	1313 C 6	0213 C 6	0107 B 5	9270 C 2	9204 B 1	7265 C 4	6270 C 2	3320 B 1	3295 D 2	3284 C 3	3273 B 2	3261 B 2	2290 C 2	2279 C 1	2267 D 3	1263 D 4	3350 A 4
1316 A 3	9320 C 5	7310 B 5	6278 A 4	3308 B 4	1314 A 7	0214 C 6	0201 D 7	9271 B 4	9205 B 1	7266 C 4	6271 B 3	3321 C 1	3296 C 2	3285 C 3	3274 B 4	3262 C 2	2291 C 1	2280 C 3	2268 B 2	1264 C 1	3351 A 4
1375 A 3	9321 A 7	9272 B 4	6279 B 4	3309 B 4	1317 A 5	0215 C 6	0202 C 7	9275 C 1	9209 B 3	7267 D 1	6272 B 3	3325 B 3	3297 C 2	3286 C 3	3275 C 3	3263 C 2	2292 B 2	2281 D 1	2269 C 2	1265 C 1	3352 A 4
1376 B 3	9323 A 5	9310 B 6	6310 C 5	3311 C 5	1318 A 6	0216 D 6	0203 C 7	----	9212 D 2	7268 C 1	6273 C 3	6260 C 2	3298 C 2	3287 C 4	3276 C 3	3264 D 1	2295 C 2	2282 D 1	2271 C 1	1320 D 3	9000 A 4
2297 A 3	9350 B 6	9311 B 6	6311 C 5	3312 B 4	1319 A 5	0217 D 6	0204 C 7	1361 D 6	9261 B 4	7269 C 2	6274 B 3	6262 D 3	3301 C 1	3288 C 1	3277 B 3	3265 D 1	2296 C 3	2283 D 1	2272 B 1	2260 B 3	9001 A 4
2298 A 3	9351 B 7	9312 A 7	6312 C 5	3313 B 4	2293 A 5	0305 C 6	0205 C 7	6360 D 6	9262 B 4	7270 B 2	6275 B 1	6264 D 3	3302 D 2	3289 C 1	3278 C 3	3266 D 2	2299 D 2	2284 D 1	2273 D 1	2261 C 4	9002 A 4
2300 A 4	9352 B 7	9313 A 7	6313 C 5	3314 C 4	2294 B 5	0307 C 6	0206 B 7	6361 D 6	9263 B 3	7271 B 1	6276 B 2	6265 C 1	3303 B 2	3290 B 3	3279 C 2	3267 D 3	2302 B 3	2285 D 2	2274 C 2	2262 C 4	9003 A 4
2301 A 3	9353 B 6	9314 B 7	6314 C 5	3315 C 4	2310 C 5	0309 C 7	0207 B 7	----	9264 B 1	7275 B 4	7260 B 2	6266 C 1	3304 B 1	3291 C 2	3280 B 3	3269 C 3	2312 D 1	2286 D 2	2275 C 1	2263 C 3	----
3318 B 2	----	9315 B 6	6315 C 5	3316 C 4	2311 C 5	0311 C 7	0210 B 6	0101 A 6	9266 C 3	9200 D 3	7262 B 3	6267 B 4	3305 B 1	3292 C 2	3281 C 2	3270 C 2	2313 B 3	2287 C 2	2276 C 1	2264 D 4	1260 C 1
3323 A 4	1250 A 3	9316 A 7	7272 B 5	5310 B 5	2315 B 5	0313 C 7	0211 C 6	0104 A 5	9267 D 4	9201 D 1	7263 D 2	6268 B 4	3317 B 1	3293 C 1	3282 C 2	3271 C 2	2314 D 3	2288 B 2	2277 D 1	2265 D 2	1261 C 4
3324 A 3	1251 B 3	9317 A 7	7273 B 5	5311 B 6	3306 A 4	0314 B 7	0212 C 6	0105 B 5	9268 B 2	9203 C 3	7264 D 2	6269 C 2	3319 D 1	3294 C 1	3283 C 4	3272 B 2	3260 B 4	2289 B 2	2278 D 2	2266 D 3	1262 B 1



7
6
5
4
3
2
1
A
B
C
D
COPPER SIDE VIEW
8204 090 54793A
SUPPLY +
AMPLIFIER
PB ASSY
97-04-03
SOLDER DIRECTION
ACT CONN
AMPL
MUTE
VI =12V
LF
LS
POWER
LED
RED
GREEN
ITC LEUVEN
INTERLEUVENLAAN 76
3001 LEUVEN
PHILIPS
UL - mark
3104 213 34653A
30V
23V
12V
25.5V
T-5A(18W)
T-2.5A(8W)
FB206W

ELECTRICAL PARTS LIST - SUPPLY & AMPLIFIER BOARD

MISCELLANEOUS

1314	4822 272 10269	⚠	Voltage Selector /01
1315	4822 276 13224		Mains Switch
1316	4822 265 20723		Connector 2 pin
1317	4822 265 20723		Connector 2 pin
1318	4822 265 31015	⚠	Mains Socket
1319	4822 071 52002	⚠	Fuse T2A 250V /01
1320	4822 071 55002	⚠	Fuse T5A 250V
1376	4822 265 10872		Loudspeaker Socket

CAPACITORS

2261	4822 124 81029	100µF 20% 25V
2262	4822 124 11909	470µF 20% 25V
2263	4822 124 41993	2200µF 20% 35V
2264	4822 122 33195	100pF 10% 50V
2265	5322 121 42386	100nF 5% 63V
2266	5322 121 42386	100nF 5% 63V
2267	4822 124 80563	4700µF 20% 35V
2271	4822 122 33519	470pF 10% 50V
2272	4822 126 12882	100nF +80/-20% 50V
2273	4822 126 12785	47nF 50V
2274	4822 122 33519	470pF 10% 50V
2275	5322 121 42386	100nF 5% 63V
2276	5322 121 42386	100nF 5% 63V
2277	4822 121 41857	10nF 5% 250V
2278	4822 121 41857	10nF 5% 250V
2279	4822 121 41854	150nF 5% 63V
2280	4822 124 81029	100µF 20% 25V
2281	4822 124 41751	47µF 20% 50V
2282	4822 124 80857	470µF 16V
2283	4822 124 41751	47µF 20% 50V
2284	4822 124 40242	1µF 20% 63V
2285	4822 124 40246	4,7µF 20% 63V
2286	4822 124 40255	100µF 20% 63V
2290	4822 124 40242	1µF 20% 63V
2292	4822 122 33195	100pF 10% 50V
2293	4822 124 81151	22µF 50V
2294	4822 124 81151	22µF 50V
2296	4822 121 51387	10nF 20% 16V
2297	4822 126 12339	2,2nF 10%
2298	4822 126 12339	2,2nF 10%
2299	4822 124 40255	100µF 20% 63V
2300	4822 126 11585	22nF +80/-20% 25V
2301	4822 126 11585	22nF +80/-20% 25V
2312	4822 122 33195	100pF 10% 50V
2313	4822 121 51387	10nF 20% 16V

RESISTORS

3262	4822 052 10159	⚠	15R 5% 0,33W
3263	4822 052 10159	⚠	15R 5% 0,33W
3264	4822 116 83872		220R 5% 0,5W
3265	4822 116 52283		4k7 5% 0,5W
3266	4822 050 11002		1k 1% 0,4W
3267	4822 050 11002		1k 1% 0,4W
3274	4822 116 83874		220k 5% 0,5W
3275	4822 116 52271		33k 5% 0,5W
3276	4822 116 52304		82k 5% 0,5W
3278	4822 116 52283		4k7 5% 0,5W
3279	4822 116 83864		10k 5% 0,5W
3280	4822 116 52285		470k 5% 0,5W
3281	4822 116 83884		47k 5% 0,5W
3282	4822 116 83884		47k 5% 0,5W
3283	4822 116 83884		47k 5% 0,5W
3284	4822 116 52283		4k7 5% 0,5W
3285	4822 116 83884		47k 5% 0,5W
3286	4822 050 11002		1k 1% 0,4W
3287	4822 050 11002		1k 1% 0,4W
3288	4822 116 83961		6k8 5%
3292	4822 116 83884		47k 5% 0,5W
3293	4822 052 10228	⚠	2R2 5% 0,33W
3294	4822 052 10228	⚠	2R2 5% 0,33W
3295	4822 116 52219		330R 5% 0,5W
3296	4822 116 52283		4k7 5% 0,5W
3297	4822 116 83864		10k 5% 0,5W
3298	4822 116 83961		6k8 5%
3301	4822 116 52207		1k2 5% 0,5W /01/10
3301	4822 116 52231		820R 5% 0,5W /14
3302	4822 116 52249		1k8 5% 0,5W
3303	4822 116 83884		47k 5% 0,5W
3306	4822 052 10109	⚠	10R 5% 0,33W
3307	4822 116 83884		47k 5% 0,5W
3308	4822 116 83864		10k 5% 0,5W
3309	4822 116 83884		47k 5% 0,5W
3317	4822 116 52283		4k7 5% 0,5W
3319	4822 116 83883		470R 5% 0,5W
3323	4822 116 83864		10k 5% 0,5W
3324	4822 116 83864		10k 5% 0,5W

COILS & FILTERS

5311	4822 157 71285	⚠	400µH 30%
5313	4822 146 10718	⚠	Mains Transformer

DIODES

6260	5322 130 30684	1N4002GP
6262	4822 130 34382	BZX79-C8V2
6264	4822 130 82079	D3SBA20
6265	4822 130 30621	1N4148
6269	4822 130 30621	1N4148
6270	4822 130 30621	1N4148
6273	4822 130 30621	1N4148
6274	4822 130 30621	1N4148
6277	4822 130 30621	1N4148
6278	4822 130 30621	1N4148
6279	4822 130 30621	1N4148
6360	4822 130 10791	LTL-1CHGE

ELECTRICAL PARTS LIST - SUPPLY & AMPLIFIER BOARD

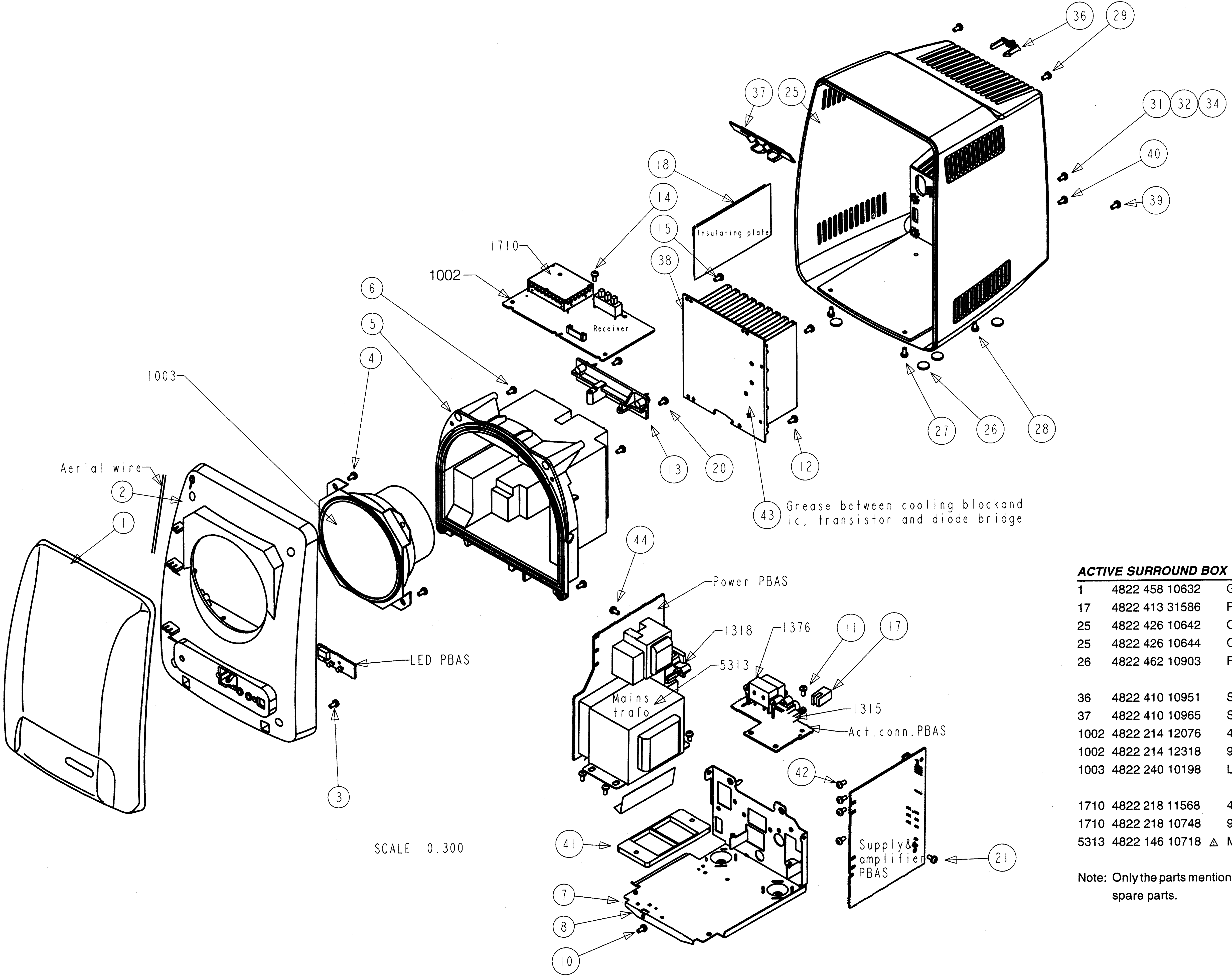
6361	4822 130 10792	LTL-1CHPE

TRANSISTORS & INTEGRATED CIRCUITS

7262	4822 209 80797	LM393N
7263	4822 130 10812	BDX53BFI
7264	4822 130 44503	BC547C
7265	4822 130 44197	BC558B
7266	4822 130 44197	BC558B
7267	4822 209 90411	AN7164
7268	4822 130 40981	BC337-25
7269	4822 130 42231	BC557C
7270	4822 130 40937	BC548B
7272	4822 130 44503	BC547C
7275	4822 209 33575	L7812CP

Note: Only the parts mentioned in this list are normal service spare parts.

ACTIVE SURROUND BOX


36
29
37
25
31
32
34
40
39
18
14
15
38
Insulating plate
1710
1002
Receiver
6
5
4
1003
27
26
28
13
20
12
Aerial wire
2
1
43
Grease between cooling blockand ic, transistor and diode bridge
44
Power PBAS
1318
1376
11
17
5313
LED PBAS
Mains trafo
1315
Act.conn.PBAS
3
42
41
Supply& amplifier PBAS
21
SCALE 0.300
7
8
10

ACTIVE SURROUND BOX

1	4822 458 10632	Grill Assy Surr (Ph)
17	4822 413 31586	Power Button
25	4822 426 10642	Cabinet Rear /01
25	4822 426 10644	Cabinet Rear /10/14
26	4822 462 10903	Foot
36	4822 410 10951	Slide Button
37	4822 410 10965	Slide Button Guide
1002	4822 214 12076	433MHz Receiver Board /01/14
1002	4822 214 12318	926MHz Receiver Board /10
1003	4822 240 10198	Loudspeaker 3R 18W
1710	4822 218 11568	433MHz Receiver Unit /01/14
1710	4822 218 10748	926MHz Receiver Unit /10
5313	4822 146 10718 ⚠	Mains Transformer

Note: Only the parts mentioned in this list are normal service spare parts.

ACCESSORIES PARTS LIST

4822 736 16138	Instruction For Use /01/10
4822 736 16141	Instruction For Use /14
4822 320 11642	Assy Cinch/Cinch 1.7m
4822 321 10249	⚠ Mains Cord /01/14
4822 321 10954	⚠ Mains Cord /10
4822 219 10161	AC/DC Adaptor /01
4822 219 10278	AC/DC Adaptor /10
4822 219 10159	AC/DC Adaptor /14

Note: Only the parts mentioned in this list are normal service spare parts.

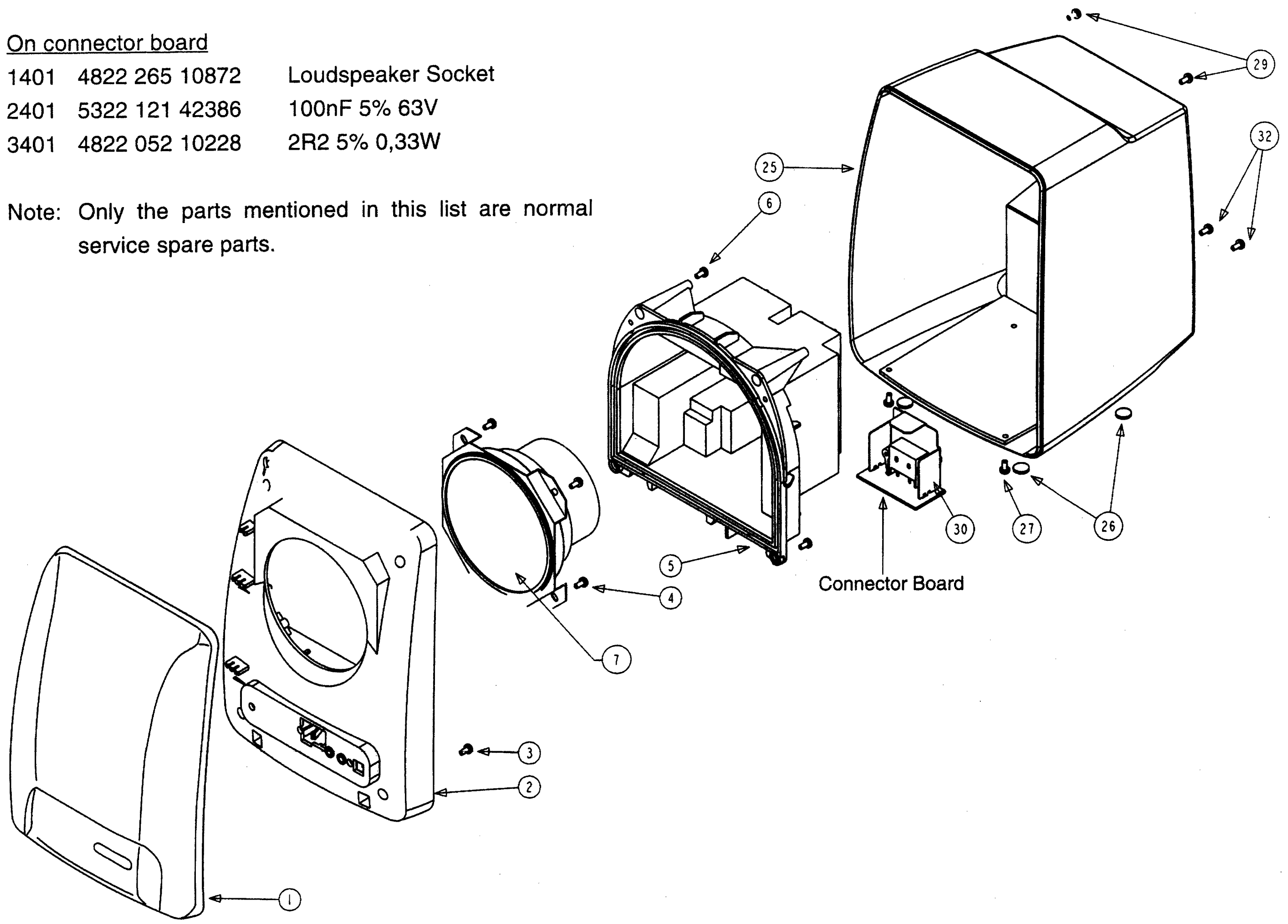
PASSIVE SURROUND BOX

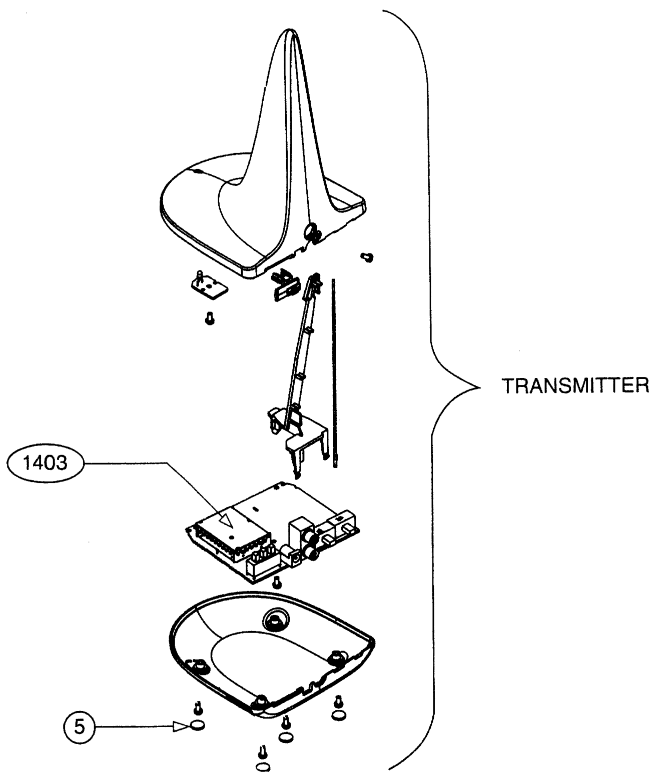
1	4822 458 10633	Grill Assembly (Ph)
7	4822 240 10198	Loudspeaker 3R 18W
26	4822 462 10903	Foot
	4822 445 10763	Passive Surround Box

On connector board

1401	4822 265 10872	Loudspeaker Socket
2401	5322 121 42386	100nF 5% 63V
3401	4822 052 10228	2R2 5% 0,33W

Note: Only the parts mentioned in this list are normal service spare parts.

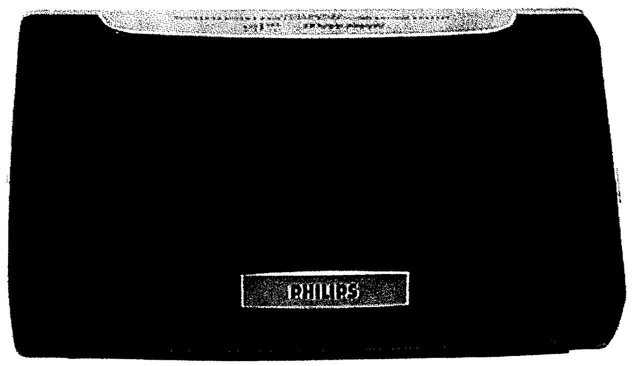




TRANSMITTER UNIT

5	4822 462 10903	Rubber Foot
1403	4822 218 11567	433MHz Modulator /01/14
1403	4822 218 11633	926MHz Modulator /10
	4822 219 10504	433MHz Transmitter /01/14
	4822 219 10505	926MHz Transmitter /10

Note: Only the parts mentioned in this list are normal service spare parts.



CENTER LOUDSPEAKER

4822 445 10764	Centre Loudspeaker Box

Note: Only the parts mentioned in this list are normal service spare parts.

ETF5 TAPE MODULE

(Dolby Version)

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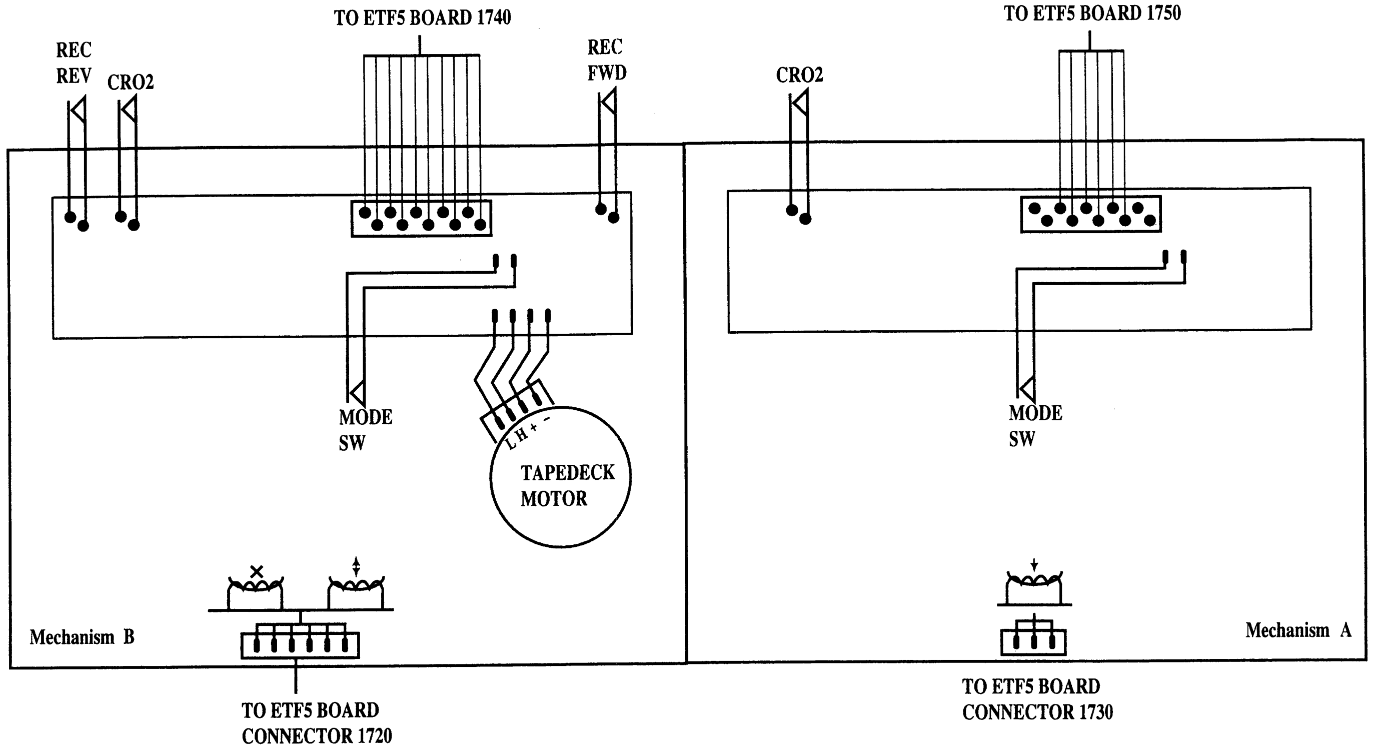
Analog Circuit diagram 9-7
Servo Circuit diagram 9-8
Dolby Circuit diagram 9-9
Exploded views & parts list..................................... 9-10
Electrical parts list... 9-13

Tapedeck wiring (Double deck)

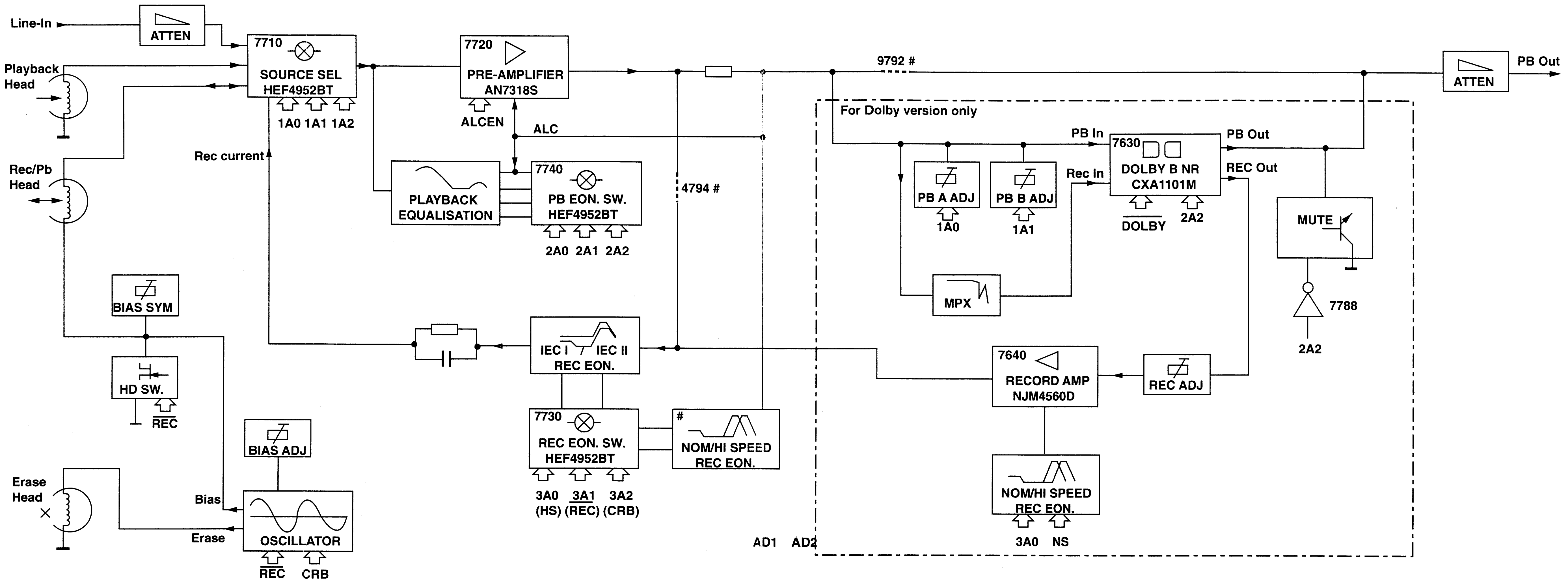

TO ETF5 BOARD 1740
REC REV
CRO2
REC FWD
MODE SW
L H + -
TAPEDECK MOTOR
Mechanism B
TO ETF5 BOARD CONNECTOR 1720
TO ETF5 BOARD 1750
CRO2
MODE SW
Mechanism A
TO ETF5 BOARD CONNECTOR 1730

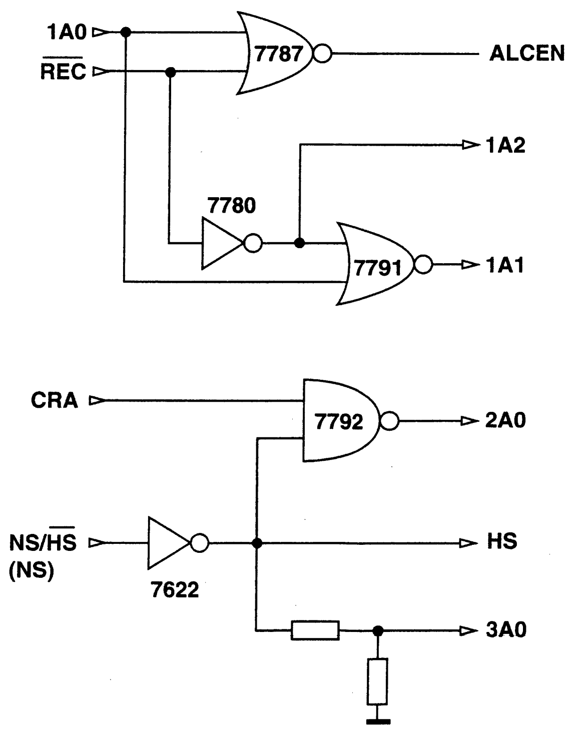
OPTIONS / VARIANTS TABLE

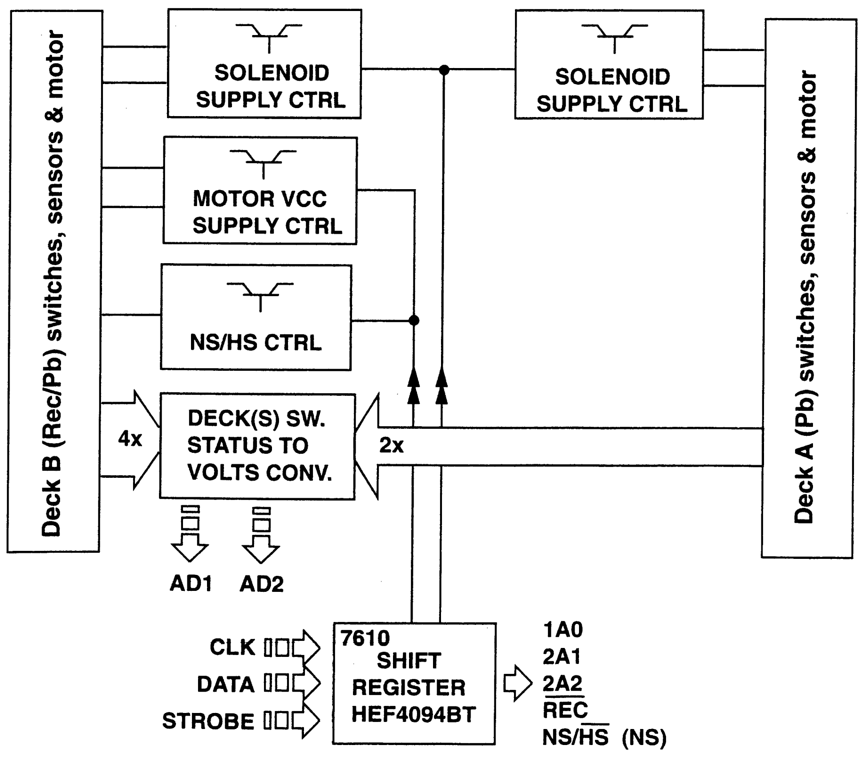
MODULE	ETF5				ETF6	
VARIANT	**1**	**2**	**3**	**4**	**5**	**6**
NAME	**DB/DD/FR**	**ND/DD/FR**	**ND/SD**	**ND/DD/FF**	**ND/DD/FR**	**ND/DD/FF**
Deck configuration	double	double	single	double	double	double
Autoreverse	yes (B)	yes (B)	yes	no	yes (B)	no
Auto-replay	no	no	no	yes (B)	no	yes (B)
Motor configuration	single	single	single	single	single	single
Auto tape type selection	yes	yes	yes	yes	yes	yes
Dolby B type Noise Reduction	yes	no	no	no	no	no
19 kHz pilot suppression	yes	no	no	no	no	no
High speed dubbing	yes	yes	no	yes	yes	yes

DB	=	Dolby B NR
DD	=	Double Deck
FF	=	Non-Autoreverse
FR	=	Autoreverse Deck B
ND	=	Non-Dolby
SD	=	Single Deck

BLOCK DIAGRAM


Line-In
ATTEN
Playback Head
Rec/Pb Head
Erase Head
7710
SOURCE SEL
HEF4952BT
1A0 1A1 1A2
7720
PRE-AMPLIFIER
AN7318S
ALCEN
ALC
Rec current
PLAYBACK EQUALISATION
7740
PB EON. SW.
HEF4952BT
2A0 2A1 2A2
4794 #
9792 #
ATTEN
PB Out
For Dolby version only
PB In
7630
DOLBY B NR
CXA1101M
PB Out
REC Out
Rec In
PB A ADJ
1A0
PB B ADJ
1A1
DOLBY
2A2
MUTE
7788
2A2
MPX
BIAS SYM
HD SW.
REC
IEC I
IEC II
REC EON.
7640
RECORD AMP
NJM4560D
REC ADJ
7730
REC EON. SW.
HEF4952BT
3A0 3A1 3A2
(HS) (REC) (CRB)
#
NOM/HI SPEED
REC EON.
NOM/HI SPEED
REC EON.
3A0 NS
BIAS ADJ
Bias
Erase
OSCILLATOR
REC CRB
AD1 AD2


1A0
REC
7787
ALCEN
1A2
7780
7791
1A1
CRA
7792
2A0
NS/HS
(NS)
7622
HS
3A0


Deck B (Rec/Pb) switches, sensors & motor
SOLENOID SUPPLY CTRL
SOLENOID SUPPLY CTRL
Deck A (Pb) switches, sensors & motor
MOTOR VCC SUPPLY CTRL
NS/HS CTRL
4x
DECK(S) SW. STATUS TO VOLTS CONV.
2x
AD1 AD2
CLK
DATA
STROBE
7610
SHIFT REGISTER
HEF4094BT
1A0
2A1
2A2
REC
NS/HS (NS)

NOTE: # For Non-dolby version only
Only 1 channel is presented.

▯▯⇨ MicroProcessor Control / Communication lines

⇨ Direct / Indirect Control lines from Shift Registers

Brief introduction

General

1. Playback Mode
   Signal from the playback head Deck A or Deck B is selected and fed through by the Mode Selector IC7710 (HEF4952B). The signal is amplified by amplifier IC7720 (AN7318S) before feeding to the IC7740 (HEF4952B) and then output to the AF Board through pins 5 and 6 of the connector 1701.

2. Recording Mode
   Recording Signal is selected and fed through by the Mode Selector IC7710 (HEF4952B) which is then amplified by the amplifier IC7720 (AN7318S). The amplified output signal will pass through IC7730 (HEF4952B) and then back to IC7710 (HEF4952B) before registered into the Rec/PB Head of Deck B.

3. Dubbing Mode
   In Dubbing mode, signal from the playback head Deck A is selected and fed through by the Mode Selector IC7710 (HEF4952B) which is then equalised for playback mode by the amplifier IC7720 (AN7318S) so that a flat response is obtained after the pre-amp. The equalised signal will then follow the same path as in the Recording mode.

4. Mode Selector
   The Mode Selector IC7710 (HEF4952B) caters for 4 inputs signal, namely Playback Signal from Deck A, Playback Signal from Deck B, Recording Signal and Dubbing Signal.

5. Amplifier PB/REC
   Amplifier IC7720 (AN7318S) is for the purpose of amplifying the Playback and Recording signal from the Mode Selector.

6. Automatic Level Control (ALC)
   ALC circuit consists of resistors (3765, 3766, 3767), capacitors (2762 , 2763) and control by transistor 7787 (BC847B). ALC limits the amplifier output to a constant value when input signal becomes too large, thus limiting recording current to below saturation level, to prevent recording distortion.

7. Muting Circuit (For Non-Dolby only)
   Switch S4 of the IC7740 (HEF4952B) is for the purpose of muting the output during Recording mode. During Recording mode, S4 is closed and shorted to the ground.

8. IC7740 (HEF4952B)
   The function of the IC7740 (HEF4952B) is to change time constant between 120us Ferro (IEC I) and 70us Chrome (IEC II) during playback mode. It will automatically determined whether the tape type is 120us Ferro (IEC I) or 70us Chrome (IEC II). This IC will switch to Flat Gain during the Recording mode.

9. IC7730 (HEF4952B)
   The function of the IC7730 (HEF4952B) is to change gain and time constant according to tape type and recording speed to boost recording current at higher frequency during recording to compensate for head loss. It will automatically determined whether the tape type is 120us Ferro (IEC I) or 70us Chrome (IEC II).

10. Bias Level
    Bias Level making use of the Variable resistor (3773) for adjusting the optimal level of the bias current for Ferro or Chrome.

11. Bias Symm (For Dolby only)
    Bias Symm making use of the Variable resistor (3785) to adjust the bias current for the left and the right channel to be equal.

12. PB Switch
    Playback Switch which consists of the FETs 7785 (For Dolby only) & 7786 (J111) is for the purpose of providing a virtual ground for the Rec/PB Head (Deck B) during Playback mode. During the Playback mode, the FETs are turn on and shorted pin 2 and 4 of connector 1720 to the ground. During Recording mode, the FETs are turn off to allow the oscillator signal to be superposition onto the Recording signal for recording.

13. Motor Speed
    During High speed dubbing, a feedback signal from the uP through pin 03 of the IC7610 (HEF4094BT) will trigger the transistors 7622 (BC847B) and 7616 (BC857B) to cause a change in the voltage level between High and Low, thus changing the speed of the motor.

14. IC7610 (HEF4094BT)
    IC7610 (HEF4094BT) is a Shift Register use for issues the logic for cmos switch ICs (HEF4952B) via 1A0, 2A1 and 2A2. IC7610(HEF4094BT) also issues logic to On/Off SOL_A, SOL_B and MOT. Recording speed is also controlled by IC7610(HEF4094BT) via NS/HS.

Dolby Circuit (For sets with Dolby B NR only)

15. IC7630 (CXA1101M)
    IC7630 (CXA1101M) in the Dolby circuit is a Dolby Noise Reduction Type B IC for the Playback and Recording signal. Noise Reduction ON/OFF are controlled by $\overline{\text{DOLBY}}$, which is from CLK, direct from uP. After clocking in DATA, CLK is set to HIGH/LOW for NR OFF/ON.

16. 19kHz Filter
    The 19kHz filters 5631 & 5632 (LXD-210) in the Dolby circuit is for the purpose of filtering the 19kHz Pilot Tone (for Tuner signal only) of the Recording signal.

17. Level Adjust
    The Variable resistor 3635, 3636,3641 and 3642 in the Dolby circuit is for adjusting the playback level of the Dolby reference (400Hz , 200nWb/m). Transistor 7631, 7632 are ON to enable adjustment of 3641, 3642 during Playback Deck A. Transistor 7633, 7634 and 3635, 3636 are active for Playback Deck B.

18. Amplifier IC7640 (NJM4560M)
    The Amplifiers 7640A & 7640B (NJM4560M) in the Dolby circuit is for the purpose of amplified the Recording signal.

19. Muting Circuit
    The muting circuit which consists of transistors 7788, 7789 and 7790 (BC847B) is for the purpose of muting the output during Recording mode.

NOTATIONS & ABBREVIATIONS USED IN THIS DOCUMENT

CR	Chrome (IEC type II)
DB	Dolby NR type B
DD	Double Deck
DM	Double Motor
FE	Ferro (IEC type I)
FF	Non Auto Reverse
FR	Auto Reverse on Deck B
Gnd x	Ground x
HSD	High speed dubbing
ND	Non Dolby
NR	Noise Reduction
NSD	Normal speed dubbing
PB	Playback
REC	Record
S/A	Sub-assy
SD	Single Deck
SM	Single Motor

CONNECTORS ASSIGNMENTS:

CONNECTOR 1701		INTERCONNECTION TO AF5 BOARD
1	REC-R	Record input right
2	REC-L	Record input left
3	GND A	AF Ground
4	+12V	D.C. supply (+12V) in
5	TAPE-R	Playback output right
6	TAPE-L	Playback output left
7	-CMOS	Negative d.c. supply (-9V) for CMOS ICs

CONNECTOR 1703		INTERCONNECTION TO AF5 BOARD
1	GND M	Motor Ground
2	+MOTOR	D.C. supply (+12V) for tape deck motor & solenoid

CONNECTOR 1706		INTERCONNECTION TO FRONT BOARD
1	AD2	Deck sensing switches output voltage / Deck A EOT
2	AD1	Deck sensing switches output voltage / Deck B EOT
3	+5	DC supply +5V for ADC network
4	GND P	Control & Oscillator Ground
5	CLK	HEF4094BT shift register Clock line
6	DATA	HEF4094BT shift register Data line
7	STROBE	HEF4094BT shift register Strobe line

CONNECTOR 1710		DECK B HEADS CONNECTON ***(For ETF6 only)***
1	B R/P HD L+	R/P Head left channel positive
2	B R/P HD R-	R/P Head right channel positive
3	CMN	R/P Head return ground
4	ERASE HEAD	Erase Head
5	GND A	Erase Head ground

CONNECTOR 1720		DECK B HEADS CONNECTON ***(For ETF5 only)***
1	B R/P HD L+	R/P Head left channel positive
2	B R/P HD L-	R/P Head left channel negative
3	B R/P HD R+	R/P Head right channel positive
4	B R/P HD R-	R/P Head right channel negative
5	ERASE HEAD	Erase Head
6	GND A	Erase Head ground

CONNECTOR 1730		DECK A HEAD CONNECTIONS ***(For Double Deck versions only)***
1	A PB HD R+	Pb Head right channel positive
2	GND A	Pb Head return ground shield
3	A PB HD L+	Pb Head left channel positive

CONNECTOR 1740		DECK B CONTROL INTERFACE ***(For ETF5 Double Deck only)***	
1	REC REW	Record tab protection status switch (reverse)	[open=on: close=off]
2	REC FWD	Record tab protection status switch (forward)	[open=on: close=off]
3	CrO2	Chrome tape detection switch	[open=Cr: close=Fe]
4	PHOTO B	Photo sensor output (tape movement indication)	
5	SOL B	Solenoid supply	
6	Vcc	Deck / Motor supply	
7	MODE	Mode switch (head engagement)	[open=off: close=engaged]
8	GND M	Deck / Motor ground	
9	H	H pin for motor	
10	L	L pin for motor	

CONNECTOR 1750		DECK A CONTROL INTERFAC ***(For ETF5 Double Deck only)***	
1	CrO2	Chrome tape detection switch	[open=Cr: close=Fe]
2	PHOTO A	Photo sensor output (tape movement indication)	
3	SOL A	Solenoid supply	
4	Vcc	Deck/Motor supply	
5	MODE	Mode switch (head engagement)	[open=off: close=engaged]
6	GND M	Deck/Motor ground	

CONNECTOR 1760		DECK B CONTROL INTERFACE ***(For ETF5 Single Deck only)***	
1	REC REW	Record tab protection status switch (reverse)	[open=on: close=off]
2	REC FWD	Record tab protection status switch (forward)	[open=on: close=off]
3	CrO2	Chrome tape detection switch	[open=Cr: close=Fe]
4	PHOTO B	Photo sensor output (tape movement indication)	
5	SOL B	Solenoid supply	
6	Vcc	Deck / Motor supply	
7	MODE	Mode switch (head engagement)	[open=off: close=engaged]
8	GND M	Deck / Motor ground	

CONNECTOR 1770		DECK B CONTROL INTERFACE ***(For ETF6 only)***	
1	REC REW	Record tab protection status switch (reverse)	[open=on: close=off]
2	REC FWD	Record tab protection status switch (forward)	[open=on: close=off]
3	CrO2 B	Chrome tape detection switch deck B	[open=Cr: close=Fe]
4	PHOTO B	Photo sensor output (tape movement indication)	
5	SOL B	Solenoid supply for deck B	
6	Vcc	Deck / Motor supply	
7	MODE B	Mode switch (head engagement)	[open=off: close=engaged]
8	GND M	Deck / Motor ground	
9	L	L pin for motor	
10	H	H pin for motor	
11	CrO2 A	Chrome tape detection switch deck A	[open=Cr: close=Fe]
12	SOL A	Solenoid supply for deck A	
13	PHOTO A	Photo sensor output (tape movement indication)	

TAPE MECHANISM A ELECTRONICS

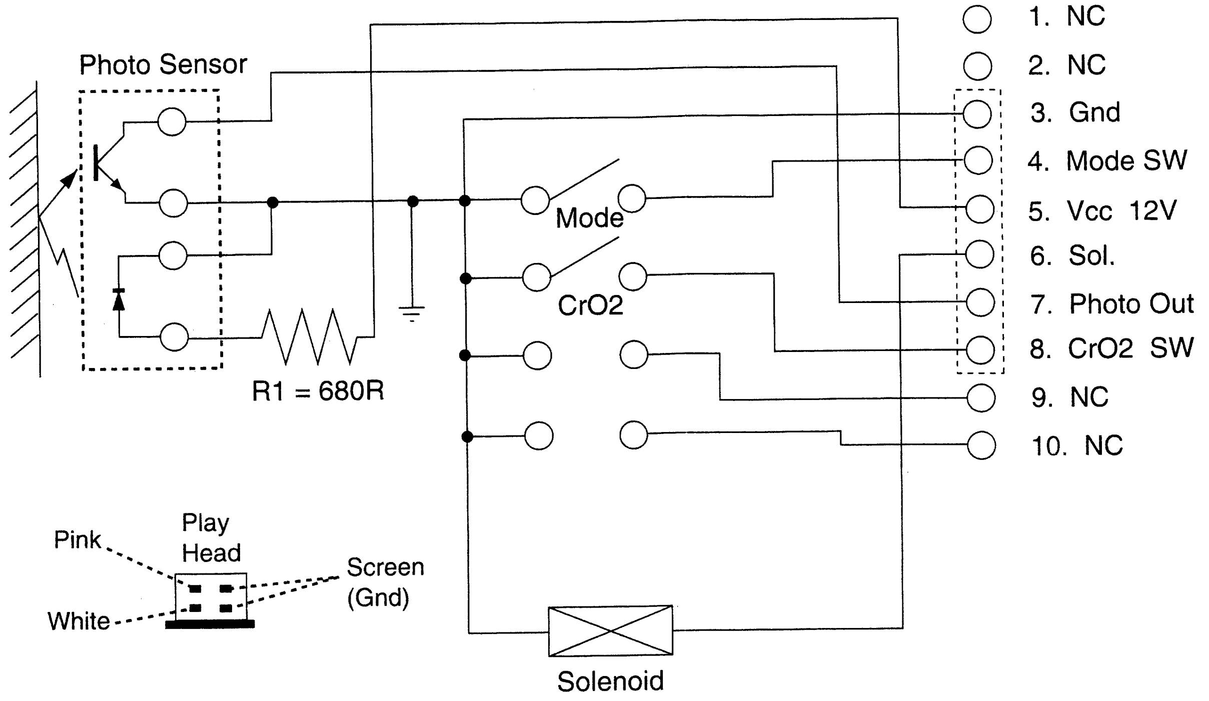
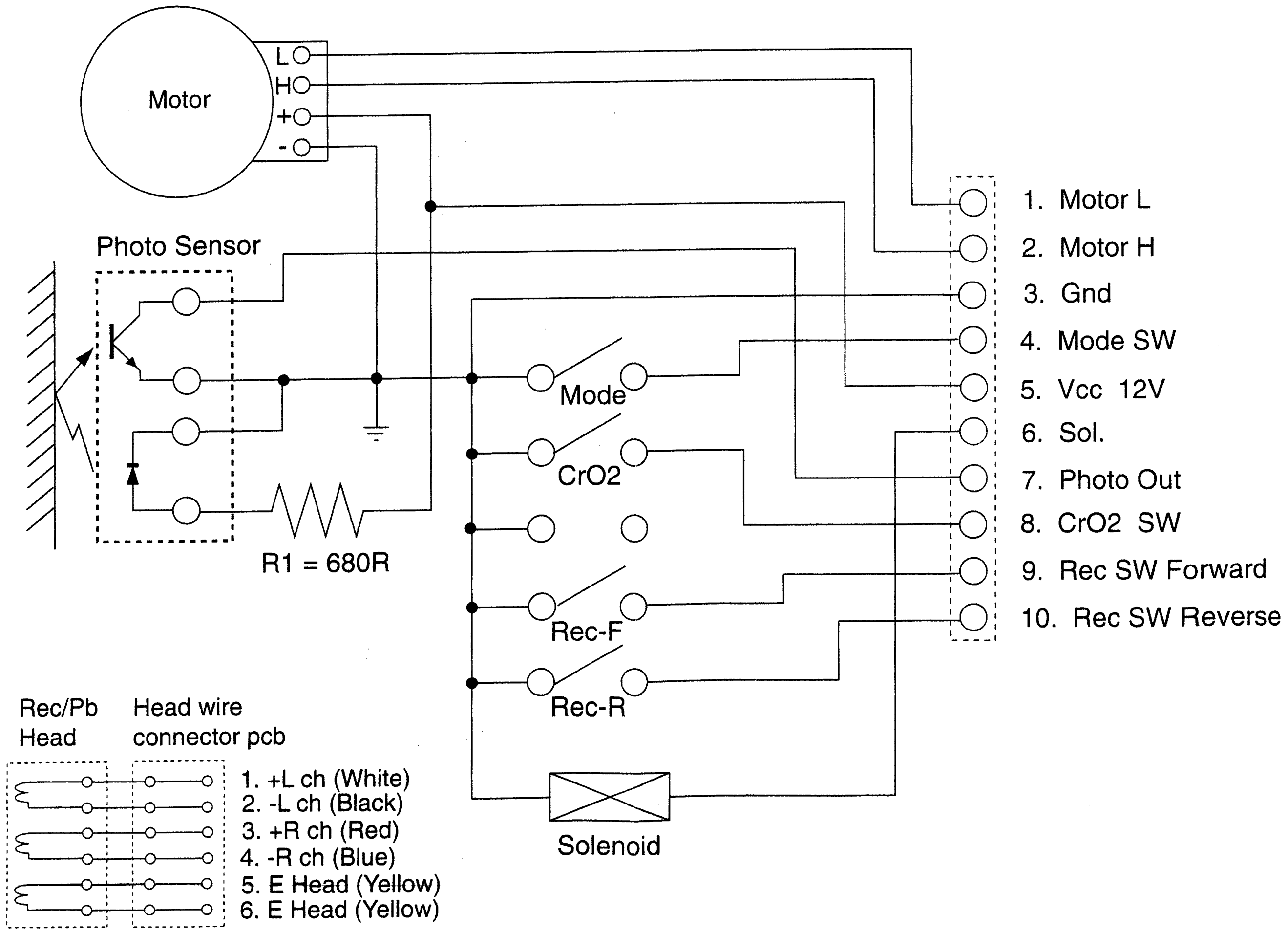


Photo Sensor
R1 = 680R
Mode
CrO2
Solenoid
Pink
Play
Head
White
Screen
(Gnd)
1. NC
2. NC
3. Gnd
4. Mode SW
5. Vcc 12V
6. Sol.
7. Photo Out
8. CrO2 SW
9. NC
10. NC

TAPE MECHANISM B ELECTRONICS


Motor
L
H
+
-
Photo Sensor
R1 = 680R
Mode
CrO2
Rec-F
Rec-R
Solenoid
1. Motor L
2. Motor H
3. Gnd
4. Mode SW
5. Vcc 12V
6. Sol.
7. Photo Out
8. CrO2 SW
9. Rec SW Forward
10. Rec SW Reverse
Rec/Pb
Head
Head wire
connector pcb
1. +L ch (White)
2. -L ch (Black)
3. +R ch (Red)
4. -R ch (Blue)
5. E Head (Yellow)
6. E Head (Yellow)

General

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST	
					with	to
ADJUST MOTOR SPEED						
HIGH SPEED	SBC420 (4822 397 30071) 3150Hz	DUBBING	◇1 or ◇2 LEFT RIGHT	frequency counter	3622 *	5040Hz ± 0.5%
NORMAL SPEED		PLAY B			3620	3150Hz ± 0.5%
		PLAY A			check	3150Hz -0.8/+1.8%
CHECK WOW & FLUTTER						
DECK A & B	SBC420 (4822 397 30071) 3150Hz	PLAY	◇1 or ◇2 LEFT RIGHT	W&F-meter	check only	≤0.4 % DIN or ≤0.35 % CCIR *
ADJUST AZIMUTH						
DECK A & B	SBC420 (4822 397 30071) 10kHz	PLAY FWD	◇1 or ◇2 LEFT RIGHT	mV-meter	left hand screw	max. output level & left=right
		PLAY REV #			right hand screw	

Playback

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST	
					with	to
ADJUST DOLBY PLAYBACK LEVEL *						
DECK A	TCC-130 (4822 397 30269) 200nWb/m	PLAY	◇7 or ◇8 LEFT RIGHT	mV-meter	3641(L), 3642(R)	548mV ±0.5dB
DECK B		PLAY FWD			3635(L), 3636(R)	
		PLAY REV #			Check	548mV ±1dB
CHECK PLAYBACK FREQUENCY RESPONSE						
PB. FREQ. RESP.	SBC420 (4822 397 30071)	PLAY	◇1 or ◇2 LEFT RIGHT	mV-meter	Check	limits see fig.1

* For Dolby version only

# For Auto-reverse version only

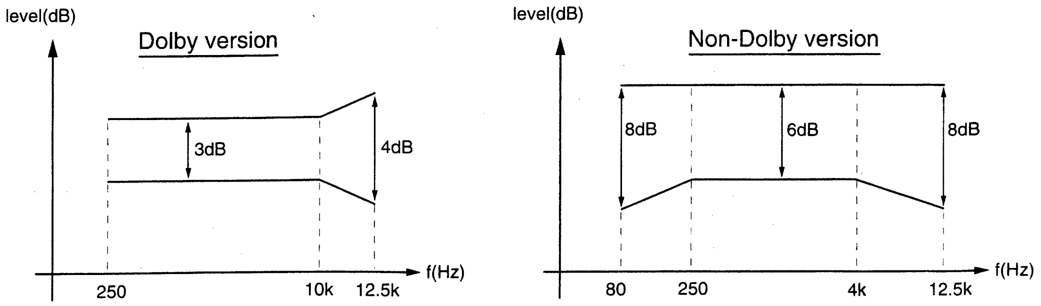


figure. 1

Recording

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST	
					with	to
PRE-ADJUST BIAS AND BIAS-SYMMETRY						
DECK B	CrO_2	RECORD	◇5 or ◇6 LEFT RIGHT	mV-meter	3773	995mV
					3785 *	left = right
	FERRO				check only	750mV ± 1.5dB
CHECK OVERALL FREQUENCY RESPONSE AND DISTORTION						
Inject 3mV signals 100Hz, 250Hz, 1kHz, 10kHz, 12.5kHz via ◇3 or ◇4	CrO_2	RECORD				
	RECORDED CASSETTE	PLAY	◇1 or ◇2 LEFT RIGHT	mV-meter	check only	limits see fig.2
Inject 1kHz 8.85mV via ◇3 or ◇4	CrO_2	RECORD				
	RECORDED CASSETTE	PLAY	◇1 or ◇2 LEFT RIGHT	THD-meter	check only	≤3%
Remark: If high frequencies are not within limits, decrease bias and re-measure. If distortion is too high increase bias and re-measure.						
ADJUST DOLBY RECORD LEVEL *						
Inject 400Hz 8.85mV via ◇3 or ◇4	CrO_2	RECORD	◇9 or ◇10 LEFT RIGHT	mV-meter	3655 & 3556	420mV
	RECORDED CASSETTE	PLAY	◇7 or ◇8 LEFT RIGHT	mV-meter	check	170mV ± 1dB
Remark: If measured value is out, re-adjust record level up or down slightly to attain play level.						

* For Dolby version only

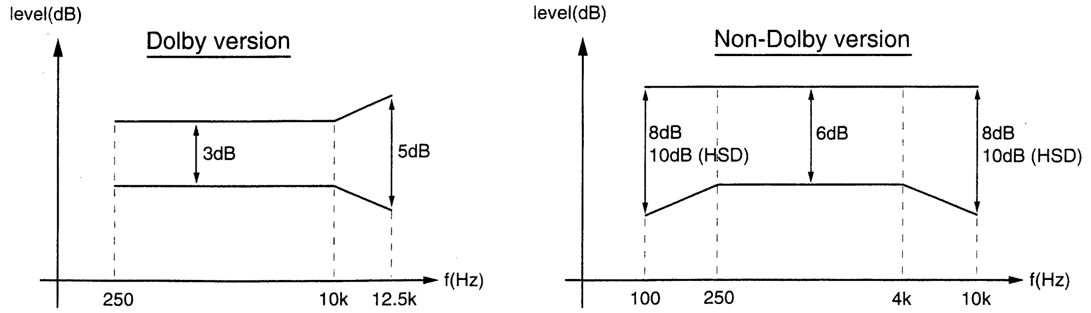
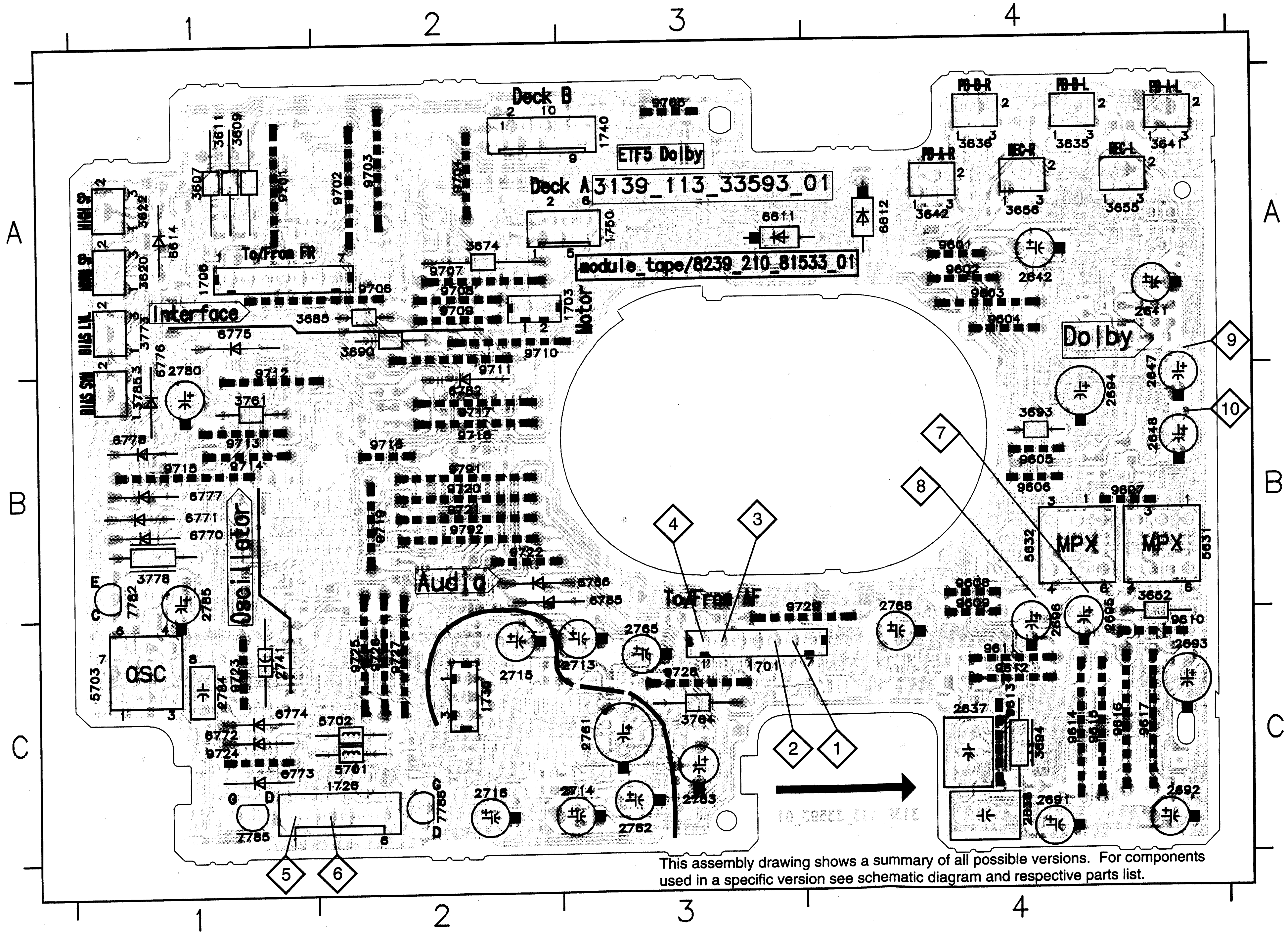


figure. 2

COMPONENT LAYOUT

1701	C3
1703	A3
1706	A1
1720	C2
1730	C2
1740	A3
1750	A3
2637	C4
2638	C4
2641	A4
2642	A4
2647	B4
2648	B4
2691	C4
2692	C4
2693	C4
2694	B4
2695	C4
2696	C4
2713	C3
2714	C3
2715	C2
2716	C2
2741	C1
2761	C3
2762	C3
2763	C3
2765	C3
2768	B4
2780	A1
2784	C1
2785	B1
3607	A1
3609	A1
3611	A1
3620	A1
3622	A1
3635	A4
3636	A4
3641	A4
3642	A4
3652	B4
3655	A4
3656	A4
3674	A2
3685	A1
3690	A2
3693	B4
3694	C4
3761	B1
3764	C3
3773	A1
3778	B1
3785	B1
5631	B4
5632	B4
5701	C2
5702	C2
5703	C1
6611	A3
6612	A4
6614	A1
6770	B1
6771	B1
6772	C1
6773	C1
6774	C1
6775	A1
6776	A1
6777	B1
6778	B1
6782	B2
6785	B3
6786	B3
7782	B1
7785	C1
7786	C2
9601	A4
9602	A4
9603	A4
9604	A4
9605	B4
9606	B4
9607	B4
9608	B4
9609	B4
9610	C4
9611	C4
9612	C4
9613	C4
9614	C4
9615	C4
9616	C4
9617	C4
9701	A1
9702	A2
9703	A2
9704	A2
9705	A3
9706	A2
9707	A2
9708	A2
9709	A2
9710	A2
9711	A2
9712	A1
9713	B1
9714	B1
9715	B1
9716	B2
9717	B2
9718	B2
9719	B2
9720	B2
9721	B2
9722	B2
9723	C1
9724	C1
9725	C2
9726	C2
9727	C2
9728	C3
9729	B3
9791	B2
9792	B2


1
2
3
4
A
B
C
Deck B
ETF5 Dolby
Deck A
3139_113_33593_01
module_tape/8239_210_81533_01
To/From FR
Interface
Motor
Dolby
MPX
MPX
Oscillator
OSC
Audio
To/From IF
HIGH SP
NORM SP
BIAS LN
BIAS SW
PB-B-R
PB-B-L
PB-A-L
PB-A-R
REC-R
REC-L
1701
1706
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5631
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5701
5702
5703
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2641
2642
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6786
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7785
1
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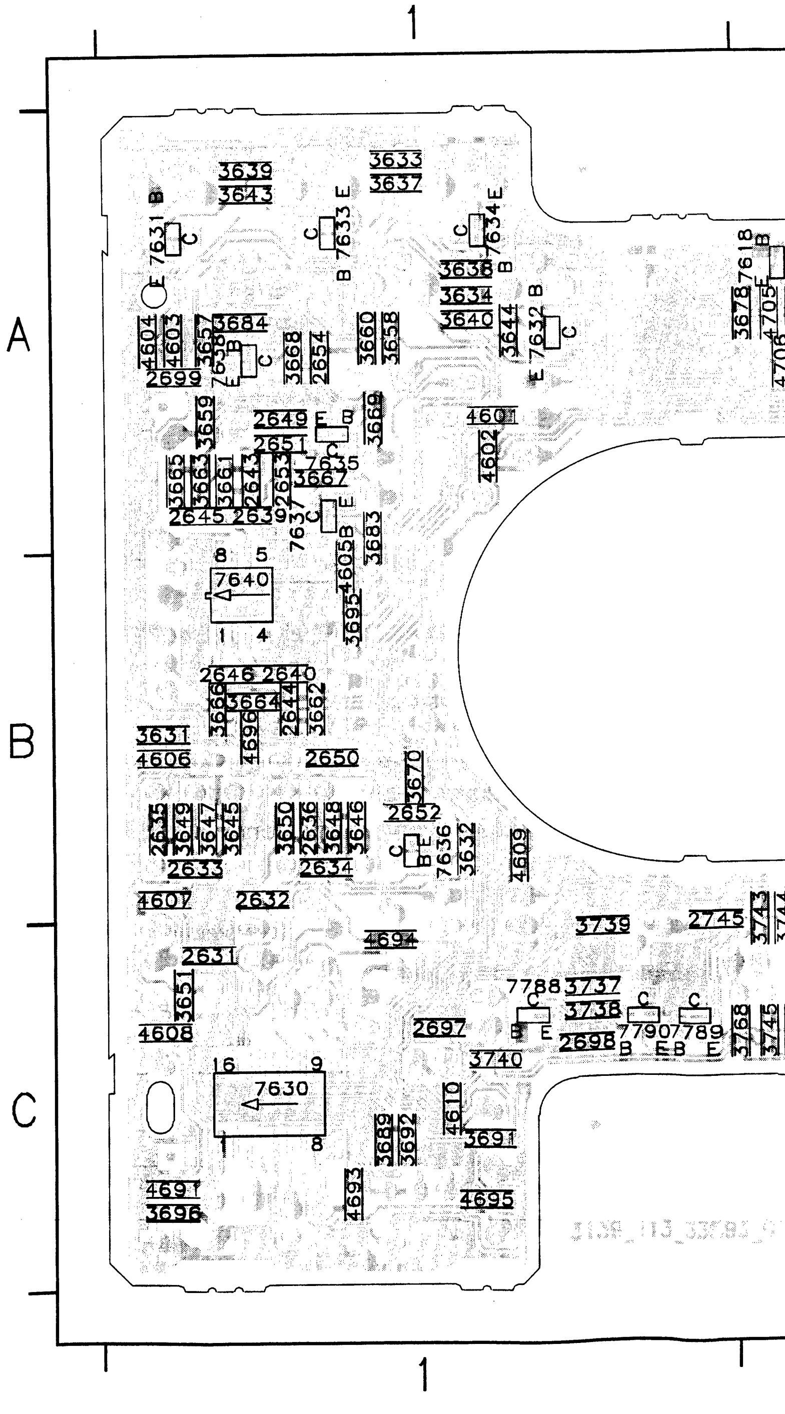
10

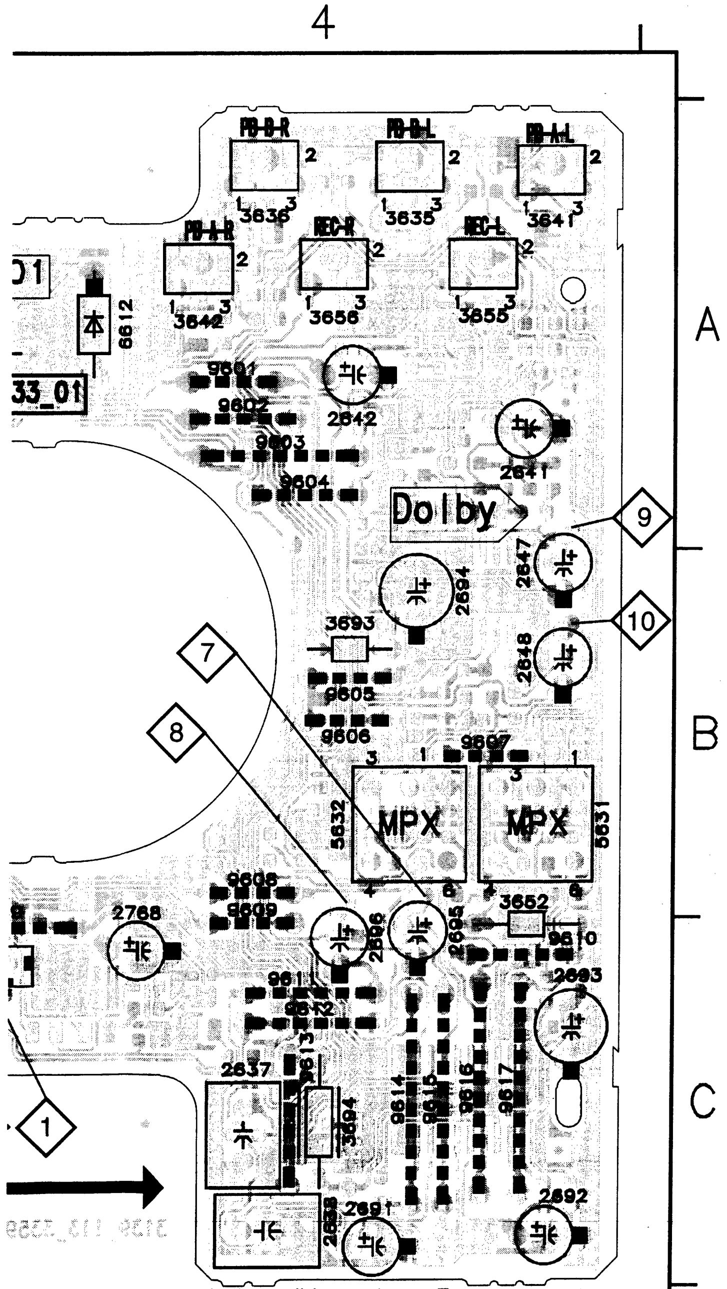
This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

CHIP LAYOUT

2621	A3
2622	A4
2623	A4
2624	A3
2625	A4
2631	C1
2632	B1
2633	B1
2634	B1
2635	B1
2636	B1
2639	A1
2640	B1
2643	A1
2644	B1
2645	A1
2646	B1
2649	A1
2650	B1
2651	A1
2652	B1
2653	A1
2654	A1
2697	C1
2698	C1
2699	A1
2701	C4
2702	C3
2703	C3
2704	C3
2705	C3
2706	C3
2707	C3
2708	C3
2709	C3
2710	C3
2711	C2
2712	C2
2717	B3
2718	C4
2719	B4
2720	B4
2721	B3
2722	B3
2723	B3
2724	B4
2725	B4
2726	B4
2727	C4
2728	B3
2729	B3
2730	B3
2733	C2
2734	C2
2735	C3
2737	C2
2738	C2
2742	B4
2743	C4
2744	B3
2745	C1
2760	B4
2769	B2
2770	B2
2781	C4
2782	B4
2786	C4
2787	C4
3601	A3
3602	A3
3603	A3
3604	A3
3605	A3
3606	A3
3608	A4
3610	A4
3612	A4
3613	A3
3614	A4
3616	A4
3618	A4
3623	A2
3624	A2
3625	A2
3626	A2
3628	A2
3630	A2
3631	B1
3632	B1
3633	A1
3634	A1
3637	A1
3638	A1
3639	A1
3640	A1
3643	A1
3644	A1
3645	B1
3646	B1
3647	B1
3648	B1
3649	B1
3650	B1
3651	C1
3657	A1
3658	A1
3659	A1
3660	A1
3661	A1
3662	B1
3663	A1
3664	B1
3665	A1
3666	B1
3667	A1
3668	A1
3669	A1
3670	B1
3672	A4
3676	A3


1
A
B
C
3639
3643
3633
3637
7631
7633
7634
3638
3634
3640
3644
7632
4604
4603
2699
3684
3668
2654
3660
3658
2649
2651
3666
4601
4602
7640
7635
3667
2645
2639
3683
3695
2646
2640
3664
3662
3631
4606
2650
3670
2652
7656
3632
4609
2633
2634
4607
2632
4694
3739
2745
2631
3651
4608
2697
7788
3737
3738
2698
7790
7789
3740
7630
3669
3692
4610
3691
4693
4691
3698
4695

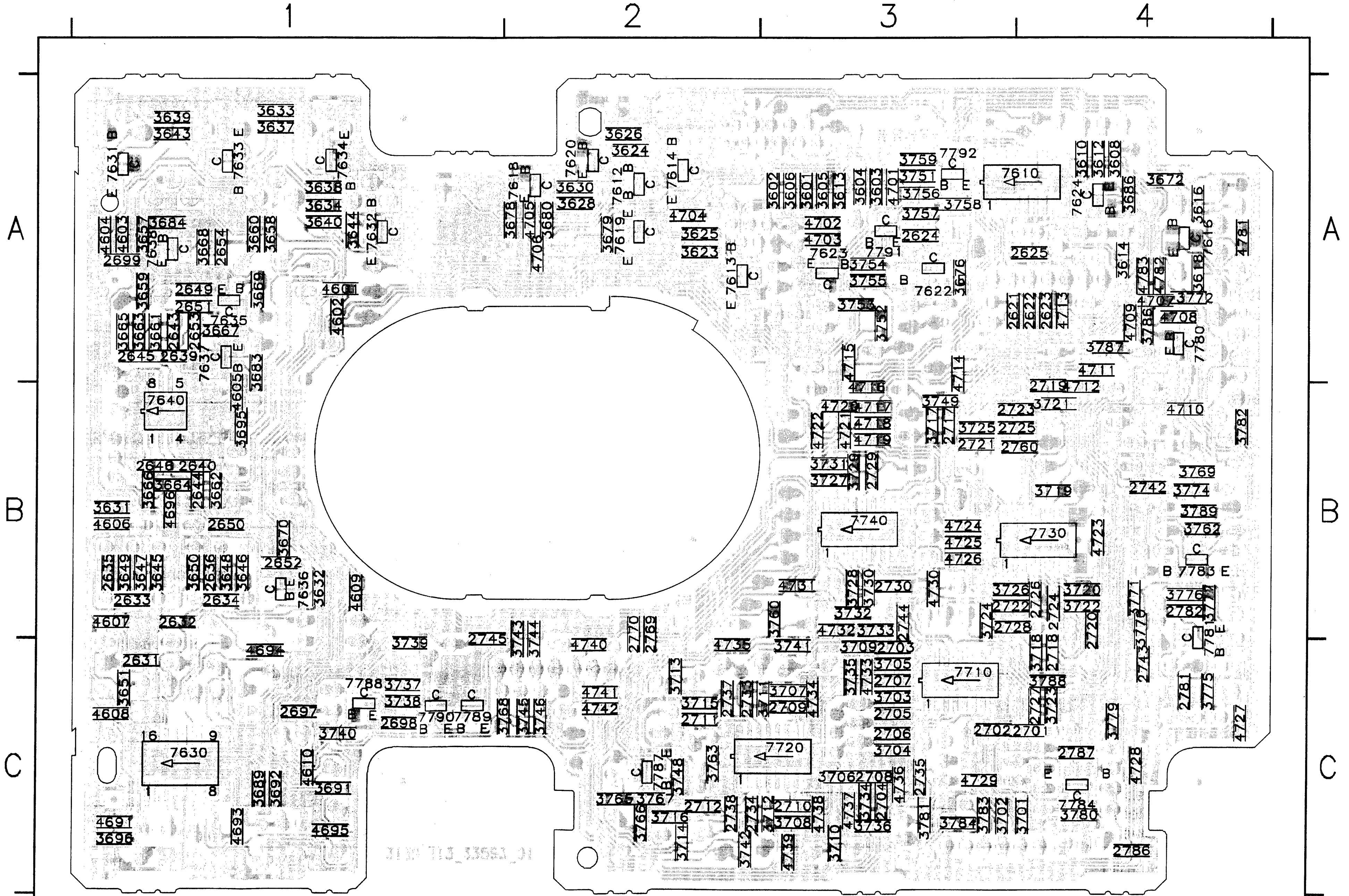
604	A4	9614	C4	9707	A2	9717	B2	9727	C2
605	B4	9615	C4	9708	A2	9718	B2	9728	C3
606	B4	9616	C4	9709	A2	9719	B2	9729	B3
607	B4	9617	C4	9710	A2	9720	B2	9791	B2
608	B4	9701	A1	9711	A2	9721	B2	9792	B2
609	B4	9702	A2	9712	A1	9722	B2		
610	C4	9703	A2	9713	B1	9723	C1		
611	C4	9704	A2	9714	B1	9724	C1		
612	C4	9705	A3	9715	B1	9725	C2		
613	C4	9706	A2	9716	B2	9726	C2		



shows a summary of all possible versions. For components
on see schematic diagram and respective parts list.

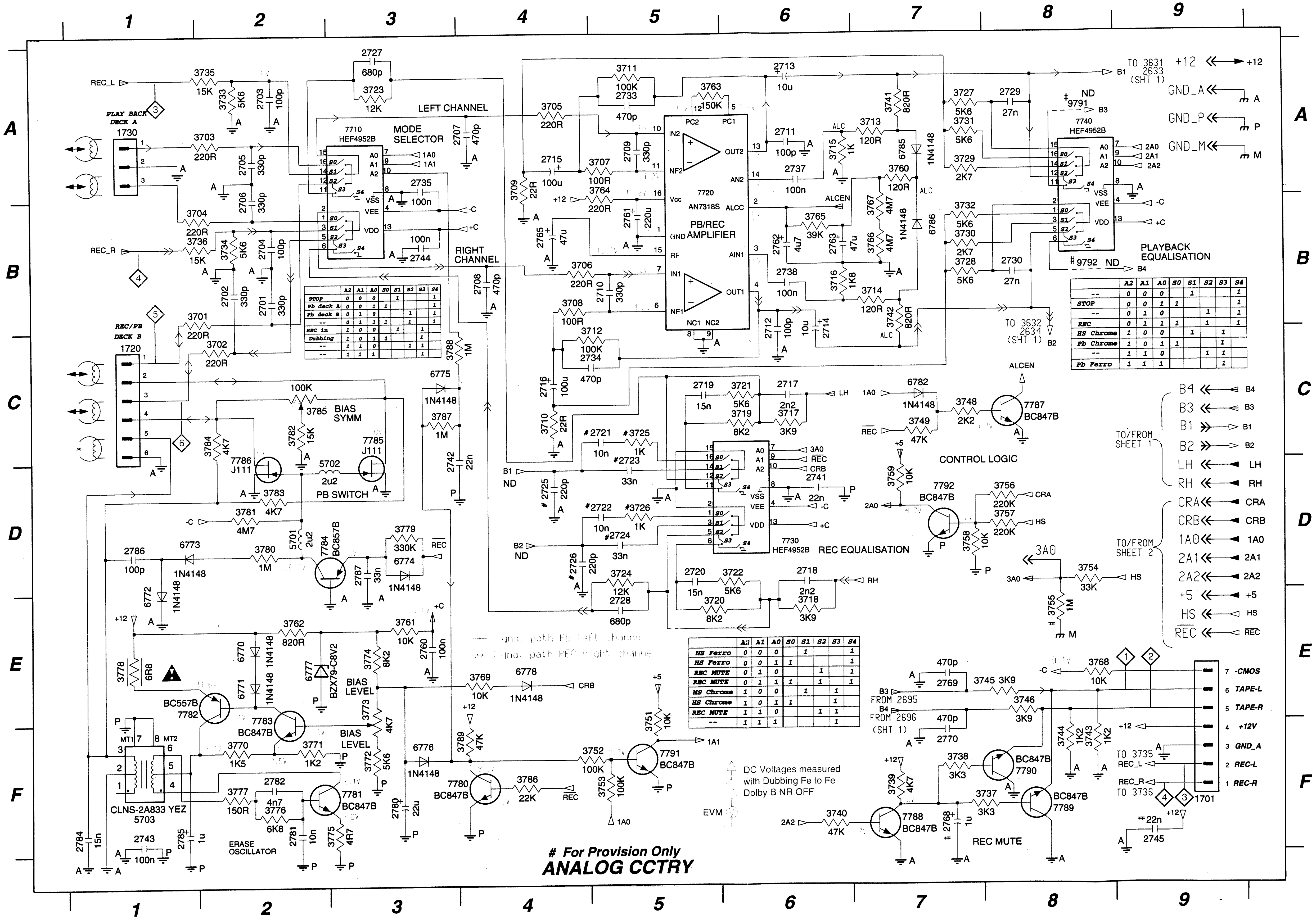
CHIP LAYOUT

2621	A3	2698	C1	2727	C4	3605	A3	3644	A1	3678	A2	3714	C2	3738	C1	3766	C2	4604	A1	4713	A4	4737	C3	7634	A1
2622	A4	2699	A1	2728	B3	3606	A3	3645	B1	3679	A2	3715	C2	3739	C1	3767	C2	4605	B1	4714	A3	4738	C3	7635	A1
2623	A4	2701	C4	2729	B3	3608	A4	3646	B1	3680	A2	3716	C2	3740	C1	3768	C2	4606	B1	4715	A3	4739	C3	7636	B1
2624	A3	2702	C3	2730	B3	3610	A4	3647	B1	3683	A1	3717	B3	3741	C3	3769	B4	4607	B1	4716	B3	4740	C2	7637	A1
2625	A4	2703	C3	2733	C2	3612	A4	3648	B1	3684	A1	3718	C4	3742	C2	3770	B4	4608	C1	4717	B3	4741	C2	7638	A1
2631	C1	2704	C3	2734	C2	3613	A3	3649	B1	3686	A4	3719	B4	3743	C2	3771	B4	4609	B1	4718	B3	4742	C2	7640	B1
2632	B1	2705	C3	2735	C3	3614	A4	3650	B1	3689	C1	3720	B4	3744	C2	3772	A4	4610	C1	4719	B3	4781	A4	7710	C3
2633	B1	2706	C3	2737	C2	3616	A4	3651	C1	3691	C1	3721	B4	3745	C2	3774	B4	4691	C1	4720	B3	4782	A4	7720	C3
2634	B1	2707	C3	2738	C2	3618	A4	3657	A1	3692	C1	3722	B4	3746	C2	3775	C4	4693	C1	4721	B3	4783	A4	7730	B4
2635	B1	2708	C3	2742	B4	3623	A2	3658	A1	3695	B1	3723	C4	3748	C2	3776	B4	4694	C1	4722	B3	7610	A4	7740	B3
2636	B1	2709	C3	2743	C4	3624	A2	3659	A1	3696	C1	3724	B3	3749	B3	3777	B4	4695	C1	4723	B4	7612	A2	7780	A4
2639	A1	2710	C3	2744	B3	3625	A2	3660	A1	3701	C4	3725	B3	3751	A3	3779	C4	4696	B1	4724	B3	7613	A2	7781	B4
2640	B1	2711	C2	2745	C1	3626	A2	3661	A1	3702	C3	3726	B3	3752	A3	3780	C4	4701	A3	4725	B3	7614	A2	7783	B4
2643	A1	2712	C2	2760	B4	3628	A2	3662	B1	3703	C3	3727	B3	3753	A3	3781	C3	4702	A3	4726	B3	7616	A4	7784	C4
2644	B1	2717	B3	2769	B2	3630	A2	3663	A1	3704	C3	3728	B3	3754	A3	3782	B4	4703	A3	4727	C4	7618	A2	7787	C2
2645	A1	2718	C4	2770	B2	3631	B1	3664	B1	3705	C3	3729	B3	3755	A3	3783	C3	4704	A2	4728	C4	7619	A2	7788	C1
2646	B1	2719	B4	2781	C4	3632	B1	3665	A1	3706	C3	3730	B3	3756	A3	3784	C3	4705	A2	4729	C3	7620	A2	7789	C1
2649	A1	2720	B4	2782	B4	3633	A1	3666	B1	3707	C3	3731	B3	3757	A3	3786	A4	4706	A2	4730	B3	7622	A3	7790	C1
2650	B1	2721	B3	2786	C4	3634	A1	3667	A1	3708	C3	3732	B3	3758	A3	3787	A4	4707	A4	4731	B3	7623	A3	7791	A3
2651	A1	2722	B3	2787	C4	3637	A1	3668	A1	3709	C3	3733	B3	3759	A3	3788	C4	4708	A4	4732	B3	7624	A4	7792	A3
2652	B1	2723	B3	3601	A3	3638	A1	3669	A1	3710	C3	3734	C3	3760	B3	3789	B4	4709	A4	4733	C3	7630	C1		
2653	A1	2724	B4	3602	A3	3639	A1	3670	B1	3711	C3	3735	C3	3762	B4	4601	A1	4710	B4	4734	C3	7631	A1		
2654	A1	2725	B4	3603	A3	3640	A1	3672	A4	3712	C3	3736	C3	3763	C2	4602	A1	4711	A4	4735	C2	7632	A1		
2697	C1	2726	B4	3604	A3	3643	A1	3676	A3	3713	C2	3737	C1	3765	C2	4603	A1	4712	B4	4736	C3	7633	A1		



This assembly drawing shows a summary of all possible versions. For components
used in a specific version see schematic diagram and respective parts list.

ANALOG CIRCUIT


1 2 3 4 5 6 7 8 9
A B C D E F
REC_L
PLAY BACK DECK A
1730
REC/PB DECK B
1720
REC_R
7710 HEF4952B
MODE SELECTOR
LEFT CHANNEL
RIGHT CHANNEL
7720 AN7318S
PB/REC AMPLIFIER
7740 HEF4952B
PLAYBACK EQUALISATION
7730 HEF4952B
REC EQUALISATION
CONTROL LOGIC
ALCEN
7787 BC847B
7792 BC847B
BIAS SYMM
PB SWITCH
7786 J111
7785 J111
7784 BC857B
BIAS LEVEL
7782 BC557B
7783 BC847B
7781 BC847B
ERASE OSCILLATOR
CLNS-2A833 YEZ 5703
7780 BC847B
7791 BC847B
7790 BC847B
7788 BC847B
7789 BC847B
REC MUTE
TO 3631 2633 (SHT 1)
TO 3632 2634 (SHT 1)
GND_A
GND_P
GND_M
TO/FROM SHEET 1
TO/FROM SHEET 2
B4 B3 B1 B2 LH RH
CRA CRB 1A0 2A1 2A2 +5 HS REC
FROM 2695
FROM 2696 (SHT 1)
TO 3735
TO 3736
1701
7 -CMOS
6 TAPE-L
5 TAPE-R
4 +12V
3 GND_A
2 REC-L
1 REC-R
EVM

DC Voltages measured with Dubbing Fe to Fe Dolby B NR OFF

MODE SELECTOR

	A2	A1	A0	S0	S1	S2	S3	S4
STOP	0	0	0		1			1
Pb deck A	0	0	1	1				1
Pb deck B	0	1	0			1		1
--	0	1	1	1		1		1
REC in	1	0	0		1		1	
Dubbing	1	0	1	1			1	
--	1	1	0			1	1	
--	1	1	1				1	

PLAYBACK EQUALISATION

	A2	A1	A0	S0	S1	S2	S3	S4
--	0	0	0		1			1
STOP	0	0	1	1				1
--	0	1	0			1		1
REC	0	1	1	1		1		1
HS Chrome	1	0	0		1		1	
Pb Chrome	1	0	1	1			1	
--	1	1	0			1	1	
Pb Ferro	1	1	1				1	

REC EQUALISATION

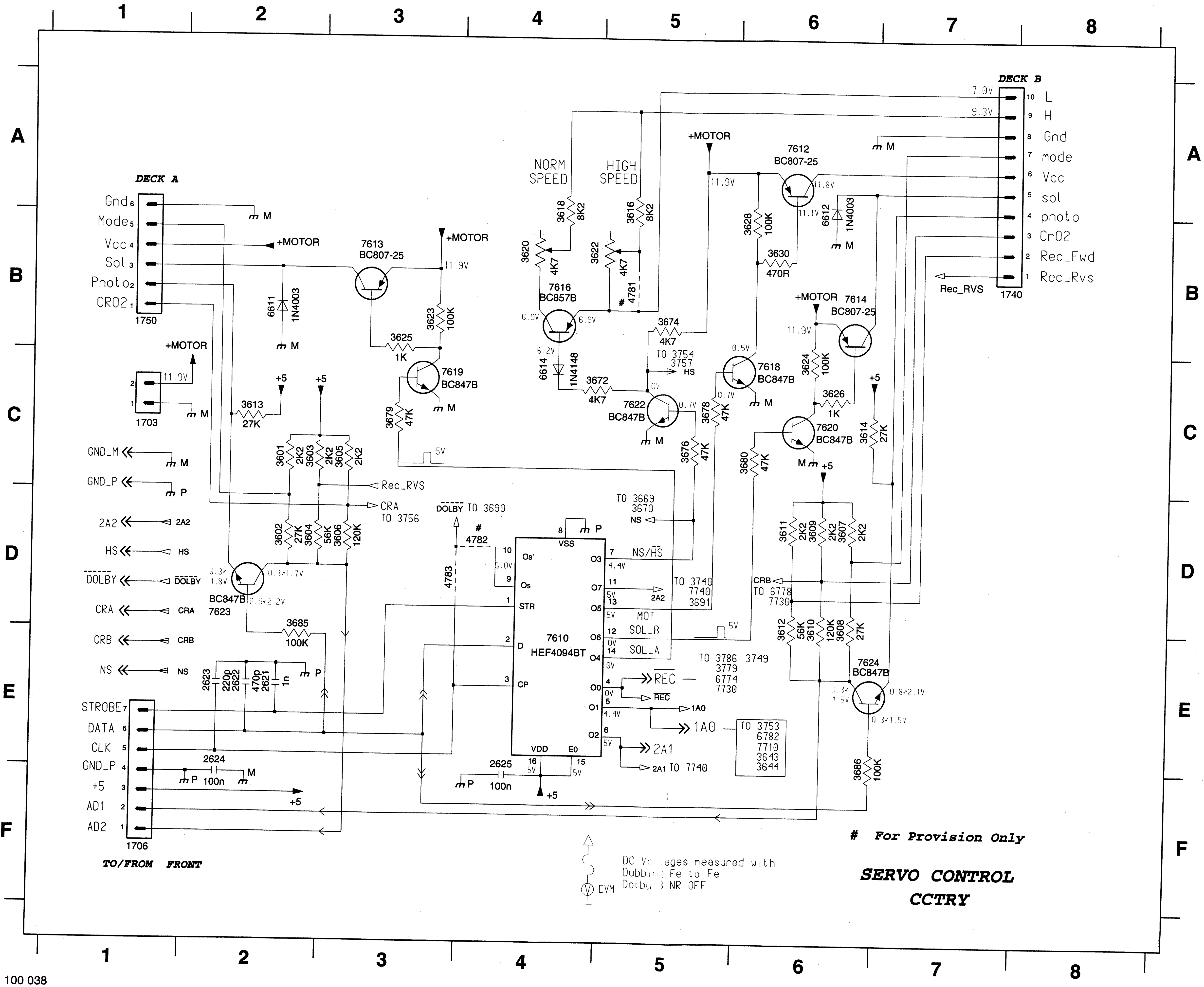
	A2	A1	A0	S0	S1	S2	S3	S4
NS Ferro	0	0	0		1			1
HS Ferro	0	0	1	1				1
REC MUTE	0	1	0			1		1
REC MUTE	0	1	1	1		1		1
NS Chrome	1	0	0		1		1	
HS Chrome	1	0	1	1			1	
REC MUTE	1	1	0			1	1	
--	1	1	1				1	

For Provision Only

ANALOG CCTRY

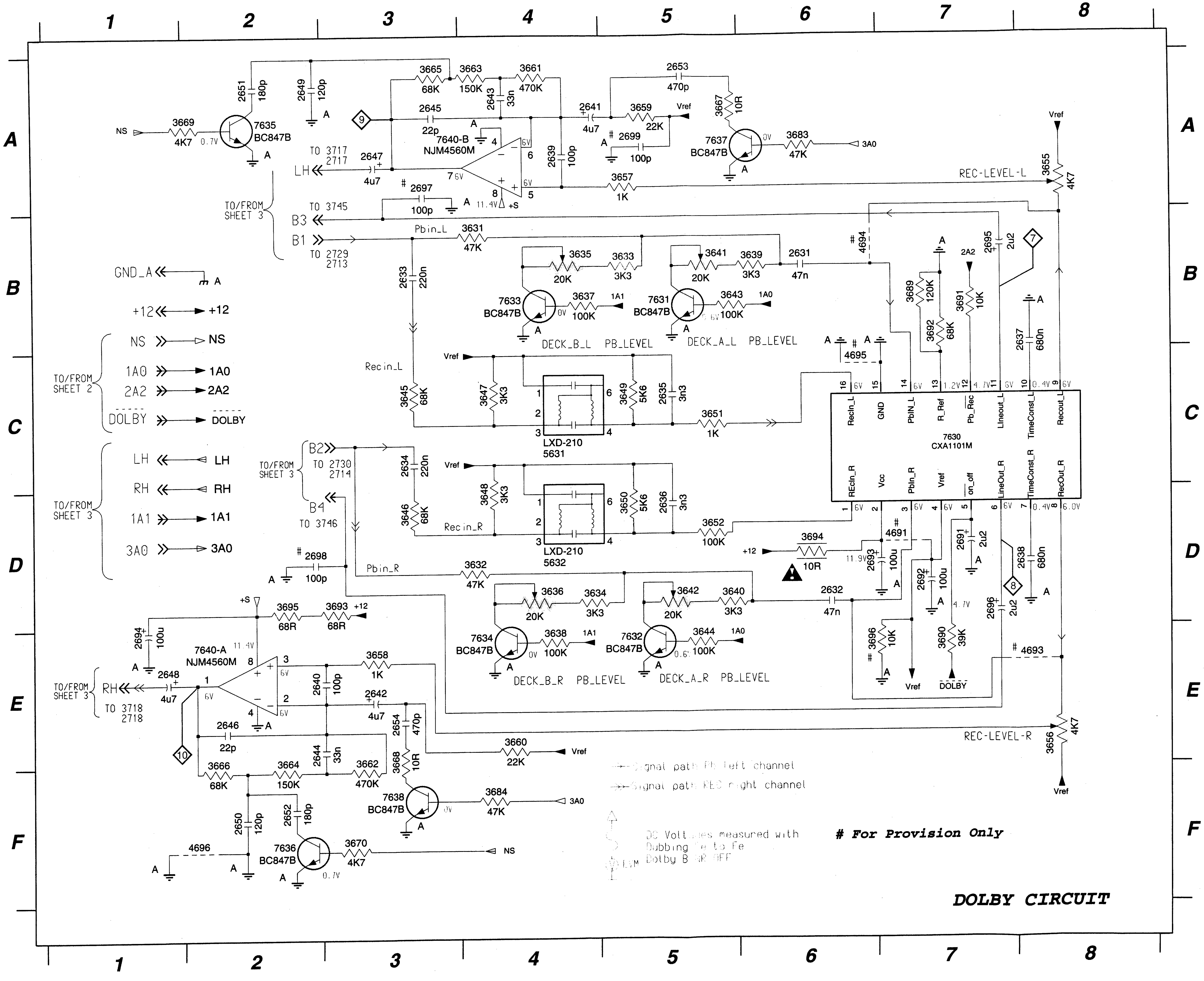
1701	F9
1720	C1
1730	A1
2701	B2
2702	B2
2703	A2
2704	B2
2705	A2
2706	A2
2707	A4
2708	B4
2709	A5
2710	B5
2711	A6
2712	B6
2713	A6
2714	C6
2715	A4
2716	C4
2717	C6
2718	D6
2719	C5
2720	D5
2721	C5
2722	D5
2723	D5
2724	D5
2725	D4
2726	D4
2727	A3
2728	E5
2729	A8
2730	B8
2733	A5
2734	C4
2735	A3
2737	A6
2738	B6
2741	D6
2742	C3
2743	F1
2744	B3
2745	F9
2760	E3
2761	B5
2762	B6
2763	B6
2765	B4
2768	F7
2769	E7
2770	F7
2780	F3
2781	F2
2782	F2
2784	F1
2785	F1
2786	D1
2787	D3
3701	B2
3702	C2
3703	A2
3704	B2
3705	A4
3706	B4
3707	A5
3708	B4
3709	A4
3710	C4
3711	A5
3712	C5
3713	A7
3714	B7
3715	A6
3716	B6
3717	C6
3718	E6
3719	C6
3720	E5
3721	C6
3722	D6
3723	A3
3724	D5
3725	C5
3726	D5
3727	A7
3728	B7
3729	A7
3730	B7
3731	A7
3732	B7
3733	A2
3734	B2
3735	A2
3736	B2
3737	F8
3738	F7
3739	F7
3740	F6
3741	A7
3742	B7
3743	F8
3744	F8
3745	E7
3746	E8
3748	C7
3749	C7
3751	E5
3752	F5
3753	F5
3754	D8
3755	E8
3756	D8
3757	D8
3758	D7
3759	D7
3760	A7
3761	E3
3762	E2
3763	A5
3764	A5
3765	B6
3766	B7
3767	B7
3768	E8
3769	E4
3770	F2
3771	F2
3772	F3
3773	E3
3774	E3
3775	F3
3776	F2
3777	F2
3778	E1
3779	D3
3780	D2
3781	D2
3782	C2
3783	D2
3784	C2
3785	C2
3786	F4
3787	C3
3788	C3
3789	F4
5701	D2
5702	D2
5703	F1
6770	E2
6771	E2
6772	E1
6773	D1
6774	D3
6775	C3
6776	F3
6777	E2
6778	E4
6782	C7
6785	A7
6786	B7
7710	A3
7720	A5
7730	D6
7740	A8
7780	F4
7781	F3
7782	E1
7783	E2
7784	D2
7785	C3
7786	D2
7787	C8
7788	F7
7789	F8
7790	F8
7791	F5
7792	D7
9791	A8
9792	B8

SERVO CONTROL CIRCUIT


1
2
3
4
5
6
7
8
A
B
C
D
E
F
DECK A
Gnd 6
Mode 5
Vcc 4
Sol 3
Photo 2
CRO2 1
1750
M
+MOTOR
6611
1N4003
7613
BC807-25
11.9V
3623
100K
3625
1K
7619
BC847B
3679
47K
5V
1703
11.9V
3613
27K
+5
3601 2K2
3603 2K2
3605 2K2
3602 27K
3604 56K
3606 120K
Rec_RVS
CRA
TO 3756
GND_M
GND_P
P
2A2
HS
DOLBY
CRA
CRB
NS
7623
BC847B
0.3↗1.8V
0.3↗1.7V
0.9↗2.2V
3685
100K
2623
2622 220p
2621 470p
1n
STROBE 7
DATA 6
CLK 5
GND_P 4
+5 3
AD1 2
AD2 1
1706
2624
100n
TO/FROM FRONT
NORM SPEED
HIGH SPEED
3618 8K2
3616 8K2
3620 4K7
3622 4K7
7616
BC857B
6.9V
6.2V
6614
1N4148
4781
#
3672
4K7
7622
BC847B
0V
0.7V
3674
4K7
TO 3754
3757
HS
+MOTOR
11.9V
3628
100K
3630
470R
7612
BC807-25
11.8V
11.1V
6612
1N4003
7618
BC847B
0.5V
3678
47K
3676
47K
+MOTOR
7614
BC807-25
3624
100K
3626
1K
7620
BC847B
3680
47K
3614
27K
DOLBY TO 3690
4782
4783
TO 3669
3670
NS
VSS
8
10 Os'
5.0V
9 Os
1 STR
2 D
3 CP
7610
HEF4094BT
16 VDD
15 E0
O3 7 NS/HS 4.4V
O7 11 2A2
O5 13 MOT
O6 12 SOL_B
O4 14 SOL_A
O0 4 REC
O1 5 1A0
O2 6 2A1
TO 3740
7740
3691
TO 3786 3749
3779
6774
7730
TO 3753
6782
7710
3643
3644
2A1 TO 7740
2625
100n
CRB
TO 6778
7730
3611 2K2
3609 2K2
3607 2K2
3612 56K
3610 120K
3608 27K
7624
BC847B
0.3↗1.5V
0.8↗2.1V
0.3↗1.5V
3686
100K
DECK B
7.0V
9.3V
10 L
9 H
8 Gnd
7 mode
6 Vcc
5 sol
4 photo
3 CrO2
2 Rec_Fwd
1 Rec_Rvs
Rec_RVS
1740
# For Provision Only
DC Voltages measured with
Dubbing Fe to Fe
Dolby B NR OFF
EVM
SERVO CONTROL
CCTRY

1703	C1
1706	F1
1740	B8
1750	B1
2621	E2
2622	E2
2623	E2
2624	E2
2625	E4
3601	C2
3602	D2
3603	C2
3604	D2
3605	C3
3606	D3
3607	D6
3608	D6
3609	D6
3610	D6
3611	D6
3612	D6
3613	C2
3614	C6
3616	A5
3618	A4
3620	B4
3622	B4
3623	B3
3624	C6
3625	B3
3626	C6
3628	B6
3630	B6
3672	C4
3674	B5
3676	C5
3678	C5
3679	C3
3680	C6
3685	E2
3686	E6
4781	B5
4782	D4
4783	D3
6611	B2
6612	A6
6614	C4
7610	E4
7612	A6
7613	B3
7614	B6
7616	B4
7618	C6
7619	C3
7620	C6
7622	C5
7623	D2
7624	E6

DOLBY CIRCUIT *(For Dolby sets only)*


1
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A
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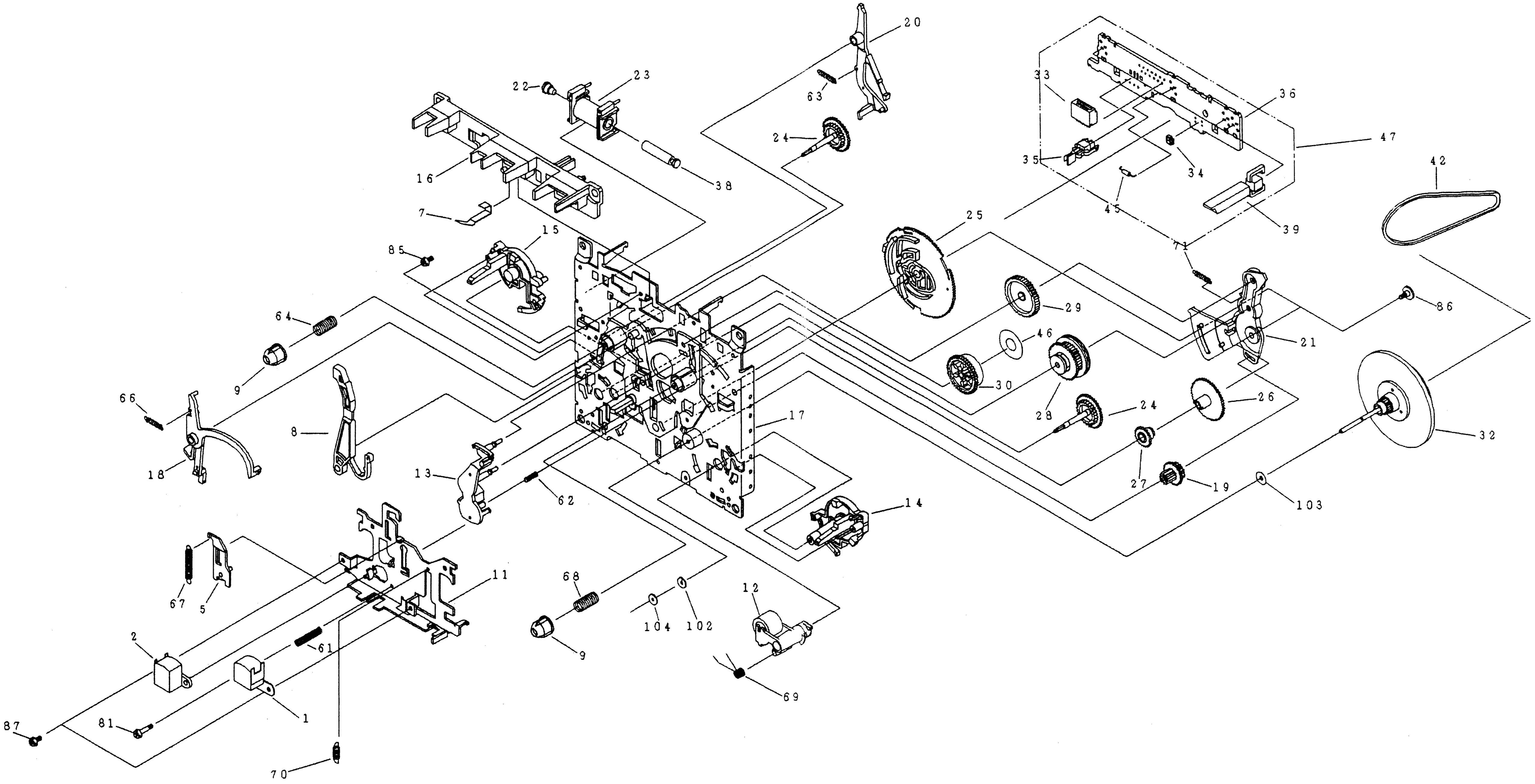
C
D
E
F
NS
3669 4K7
0.7V
7635 BC847B
2651 180p
2649 120p
3665 68K
3663 150K
3661 470K
2643 33n
2653 470p
2645 22p
9
7640-B NJM4560M
TO 3717 2717
LH
2647 4u7
2697 100p
11.4V
+S
2639 100p
2641 4u7
3659 22K
Vref
2699 100p
3667 10R
7637 BC847B
3683 47K
3A0
3657 1K
REC-LEVEL-L
3655 4K7
TO/FROM SHEET 3
TO 3745
B3
B1
TO 2729 2713
Pbin_L
3631 47K
4694
2695 2u2
7
2A2
3635 20K
3633 3K3
3641 20K
3639 3K3
2631 47n
2633 220n
7633 BC847B
3637 100K
1A1
7631 BC847B
3643 100K
1A0
DECK_B_L PB_LEVEL
DECK_A_L PB_LEVEL
3689 120K
3692 68K
3691 10K
2637 680n
4695
GND_A
+12
NS
1A0
2A2
DOLBY
TO/FROM SHEET 2
Recin_L
3645 68K
3647 3K3
3649 5K6
2635 3n3
LXD-210 5631
3651 1K
RecIn_L
GND
PbIN_L
R_Ref
Pb_Rec
Lineout_L
TimeConst_L
Recout_L
7630 CXA1101M
REcIn_R
Vcc
PbIn_R
Vref
on_off
LineOut_R
TimeConst_R
RecOut_R
LH
RH
1A1
3A0
B2
TO 2730 2714
B4
TO 3746
2634 220n
3646 68K
3648 3K3
3650 5K6
2636 3n3
Recin_R
LXD-210 5632
3652 100K
+12
3694 10R
4691
2693 100u
2692 100u
2691 2u2
2638 680n
8
2698 100p
Pbin_R
3632 47K
3636 20K
3634 3K3
3642 20K
3640 3K3
2632 47n
3696 10K
3690 39K
2696 2u2
4693
3695 68R
3693 68R
2694 100u
7640-A NJM4560M
3658 1K
2640 100p
7634 BC847B
3638 100K
7632 BC847B
3644 100K
DECK_B_R PB_LEVEL
DECK_A_R PB_LEVEL
Vref
DOLBY
RH
TO 3718 2718
2648 4u7
2642 4u7
2646 22p
2654 470p
3660 22K
REC-LEVEL-R
3656 4K7
10
3666 68K
3664 150K
2644 33n
3662 470K
3668 10R
7638 BC847B
3684 47K
2650 120p
2652 180p
7636 BC847B
3670 4K7
4696
Signal path PB left channel
Signal path REC right channel
DC Voltages measured with Dubbing Fe to Fe Dolby B ON OFF
# For Provision Only
DOLBY CIRCUIT

2631	B6
2632	D6
2633	B3
2634	C3
2635	C5
2636	D5
2637	B8
2638	D8
2639	A4
2640	E2
2641	A4
2642	E3
2643	A4
2644	E2
2645	A3
2646	E2
2647	A3
2648	E1
2649	A2
2650	F2
2651	A2
2652	F2
2653	A5
2654	E3
2691	D7
2692	D7
2693	D6
2694	E1
2695	B7
2696	D7
2697	A3
2698	D2
2699	A5
3631	B4
3632	D4
3633	B5
3634	D4
3635	B4
3636	D4
3637	B4
3638	E4
3639	B6
3640	D5
3641	B5
3642	D5
3643	B5
3644	E5
3645	C3
3646	D3
3647	C4
3648	D4
3649	C5
3650	D5
3651	C5
3652	D5
3655	A8
3656	E8
3657	A5
3658	E3
3659	A5
3660	E4
3661	A4
3662	E3
3663	A4
3664	E2
3665	A3
3666	E2
3667	A5
3668	E3
3669	A2
3670	F3
3683	A6
3684	F4
3689	B7
3690	E7
3691	B7
3692	B7
3693	D3
3694	D6
3695	D2
3696	E6
4691	D7
4693	E8
4694	B6
4695	C6
4696	F2
5631	C4
5632	D4
7630	C7
7631	B5
7632	E5
7633	B4
7634	E4
7635	A2
7636	F2
7637	A5
7638	F3
7640-A	E2
7640-B	A4

TAPE MECHANISM A - PLAY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103
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MECHANICAL PARTS - PLAY MECHANISM

1	4822 249 10397	MS15RAA2N1
2	4822 249 30146	Dummy Head
12	4822 528 10974	Assembly Arm Pinch R
23	4822 281 11069	Solenoid
32	4822 528 11209	Assembly Flywheel RV
33	4822 265 11207	Connector Socket 6 pin
34	4822 130 10205	Photo Sensor
35	4822 276 13946	Mode Switch
39	4822 278 90613	Leaf Switch
42	4822 358 10168	Belt AF 40mm
45	4822 050 16801	680R 1% 0,4w
69	4822 492 11542	Spring
102	4822 532 12931	Washer
103	4822 532 12932	Washer
104	4822 532 12933	Washer

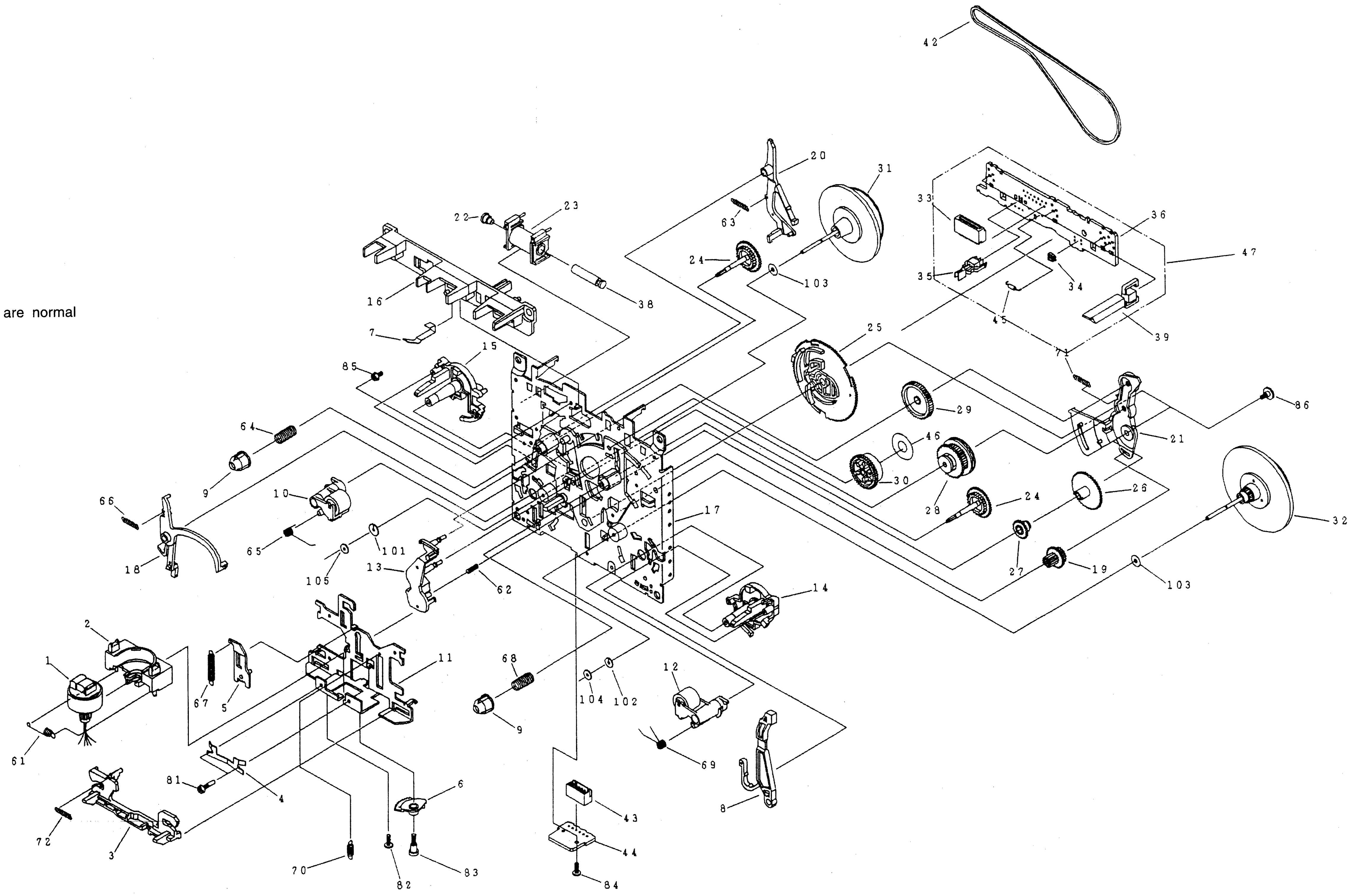
Note: Only the parts mentioned in this list are normal service spare parts.

TAPE MECHANISM B - RECORD/PLAYBACK

MECHANICAL PARTS - PLAY MECHANISM

1	4822 249 10526	Record/Playback Head
10	4822 528 10975	Assembly Arm Pinch L
12	4822 528 10974	Assembly Arm Pinch R
23	4822 281 11069	Solenoid
31	4822 528 11211	Assembly Flywheel LV
32	4822 528 11209	Assembly Flywheel RV
33	4822 265 11208	Connector Socket 10 pin
34	4822 130 10205	Photo Sensor
35	4822 276 13946	Mode Switch
39	4822 278 90613	Leaf Switch
42	4822 358 10169	Belt
45	4822 050 16801	680R 1% 0,4w
65	4822 492 11546	Spring
69	4822 492 11542	Spring
101	4822 532 12934	Washer
102	4822 532 12931	Washer
103	4822 532 12932	Washer
104	4822 532 12933	Washer
105	4822 532 12935	Washer

Note: Only the parts mentioned in this list are normal service spare parts.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101
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19
105
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103
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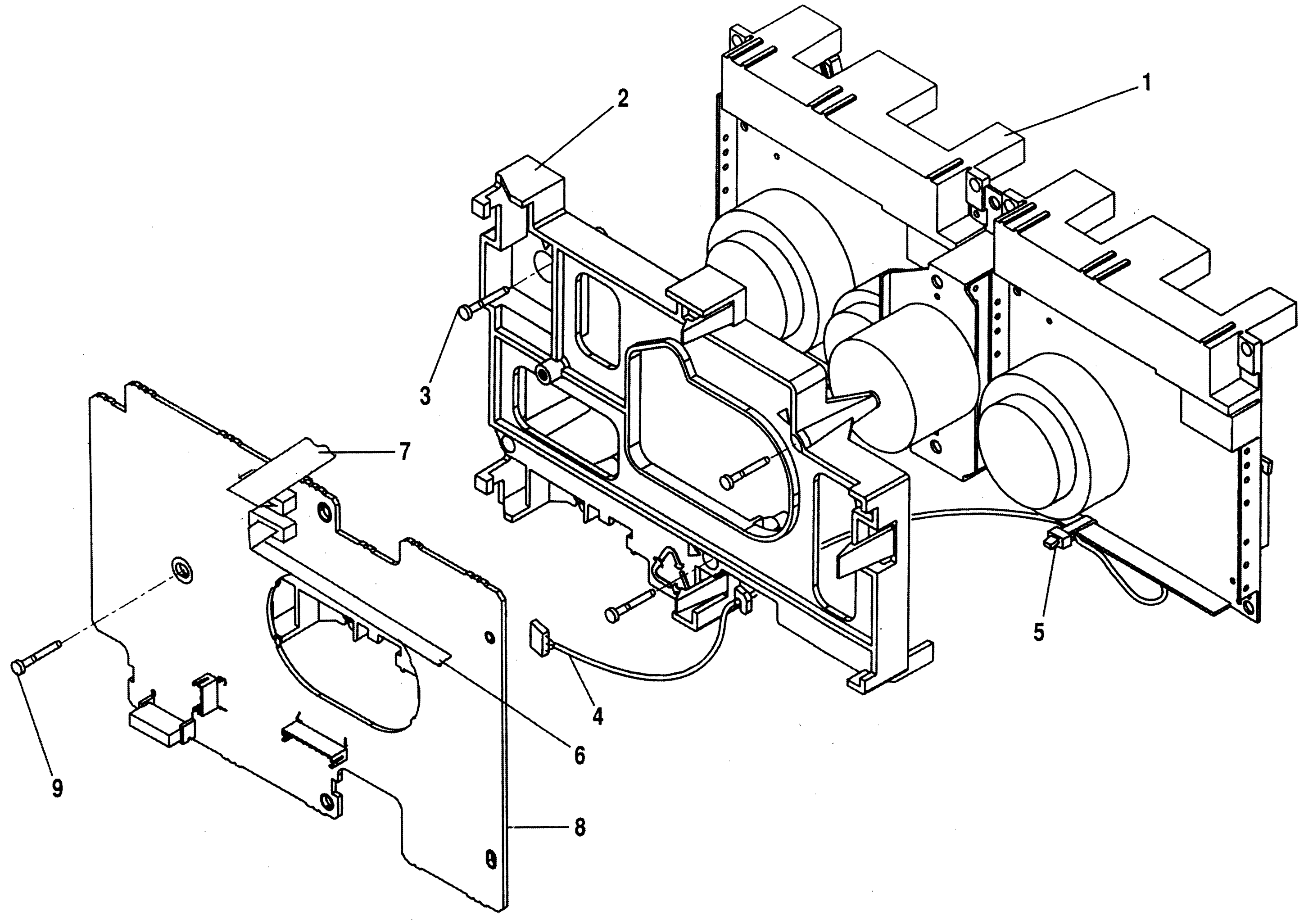


ETF5 TAPE MODULE EXPLODED VIEW

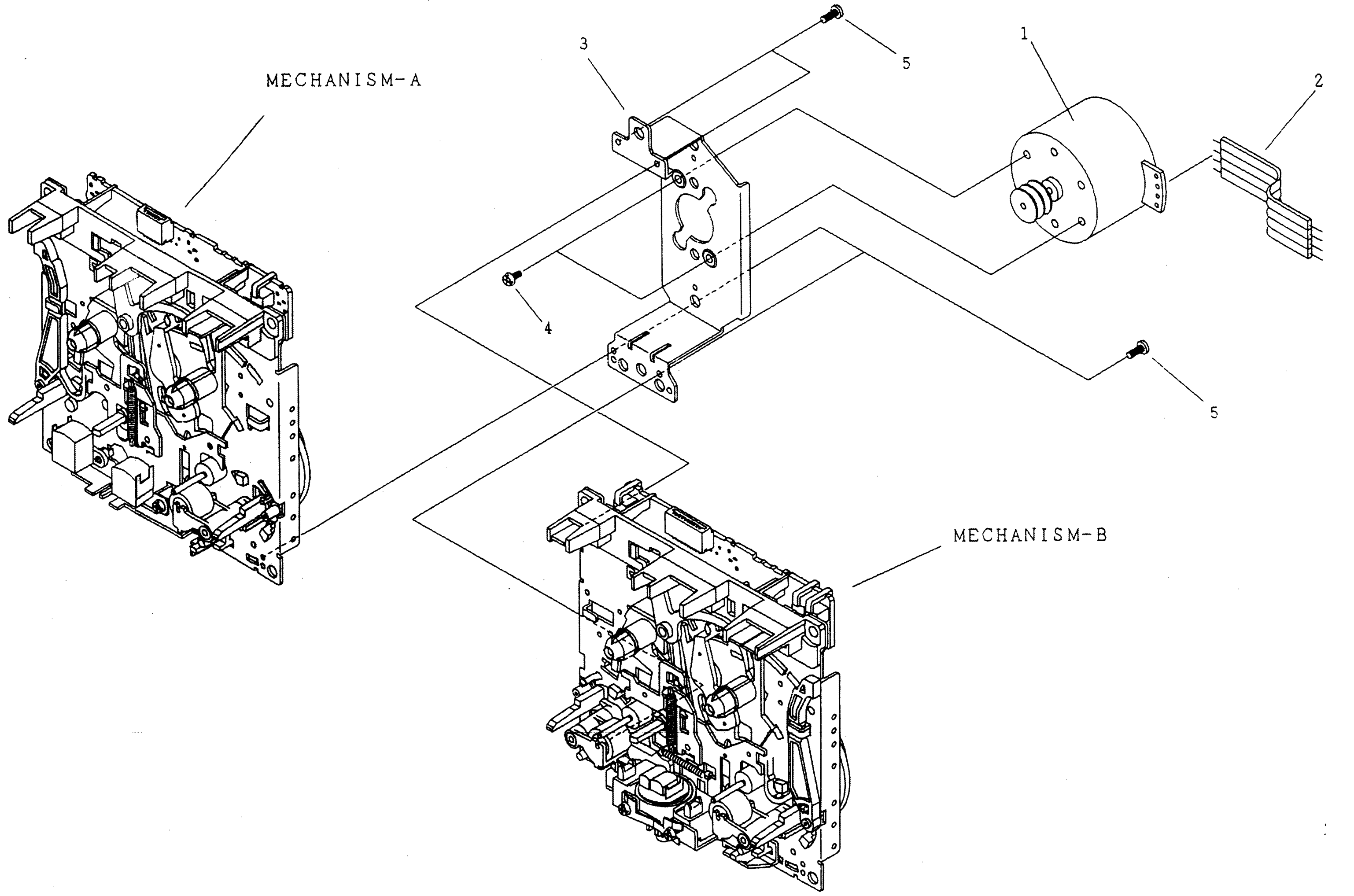
1	4822 691 10671	Tape Mechanism CWB44FR502
3	-	Screw M2 x 16
6	4822 320 12243	Flex Cable 6 pin 18 cm
7	4822 320 12242	Flex Cable 10 pin 7,5 cm
9	-	Screw D3 x 10

Note: Only the parts mentioned in this list are normal service spare parts.

TAPE MECHANISM A & B EXPLODED VIEW

1	4822 361 10841	Motor Assembly
4	-	Screw M2,6 x 4
5	-	Screw M2 x 3

Note: Only the parts mentioned in this list are normal service spare parts.



ELECTRICAL PARTS LIST - ETF5 DOLBY BOARD

MISCELLANEOUS

1740	4822 267 10729	Flex connector 10 pin
1750	4822 267 10731	Flex connector 6 pin

CAPACITORS

2621	5322 122 34123	1nF 10% 50V
2622	5322 122 34099	470pF 10% 63V
2623	4822 122 33575	220pF 5% 50V
2624	4822 126 13296	100nF 10% 16V
2625	4822 126 13296	100nF 10% 16V
2631	4822 126 12944	47nF 10% 50V
2632	4822 126 12944	47nF 10% 50V
2633	4822 126 13473	220nF +80/-20% 50V
2634	4822 126 13473	220nF +80/-20% 50V
2635	4822 122 33891	3,3nF 10% 63V
2636	4822 122 33891	3,3nF 10% 63V
2637	5322 121 42498	680nF 5% 63V
2638	5322 121 42498	680nF 5% 63V
2639	5322 122 32531	100pF 5% 50V
2640	5322 122 32531	100pF 5% 50V
2641	4822 124 40246	4,7µF 20% 63V
2642	4822 124 40246	4,7µF 20% 63V
2643	4822 126 12105	33nF 5% 63V
2644	4822 126 12105	33nF 5% 63V
2645	5322 122 32658	22pF 5% 50V
2646	5322 122 32658	22pF 5% 50V
2647	4822 124 40246	4,7µF 20% 63V
2648	4822 124 40246	4,7µF 20% 63V
2649	5322 122 33861	120pF 10% 50V
2650	5322 122 33861	120pF 10% 50V
2651	4822 126 10326	180pF 5% 63V
2652	4822 126 10326	180pF 5% 63V
2653	5322 122 34099	470pF 10% 63V
2654	5322 122 34099	470pF 10% 63V
2691	4822 124 41576	2,2µF 20% 50V
2692	4822 124 41584	100µF 20% 10V
2693	4822 124 81029	100µF 20% 25V
2694	4822 124 81029	100µF 20% 25V
2695	4822 124 41576	2,2µF 20% 50V
2696	4822 124 41576	2,2µF 20% 50V
2701	4822 122 33805	330pF 10% 63V
2702	4822 122 33805	330pF 10% 63V
2703	5322 122 32531	100pF 5% 50V
2704	5322 122 32531	100pF 5% 50V
2705	5322 122 31863	330pF 5% 50V
2706	5322 122 31863	330pF 5% 50V
2707	5322 122 34099	470pF 10% 63V
2708	5322 122 34099	470pF 10% 63V
2709	5322 122 31863	330pF 5% 50V
2710	5322 122 31863	330pF 5% 50V
2711	5322 122 32531	100pF 5% 50V
2712	5322 122 32531	100pF 5% 50V
2713	4822 124 41579	10µF 20% 50V
2714	4822 124 41579	10µF 20% 50V
2715	4822 124 41584	100µF 20% 10V
2716	4822 124 41584	100µF 20% 10V
2717	4822 122 33175	2,2nF 20% 50V
2718	4822 122 33175	2,2nF 20% 50V
2719	4822 126 13188	15nF 5% 63V
2720	4822 126 13188	15nF 5% 63V
2727	4822 122 32535	680pF 10% 63V
2728	4822 122 32535	680pF 10% 63V
2729	4822 122 32541	27nF 10% 63V
2730	4822 122 32541	27nF 10% 63V
2733	5322 122 34099	470pF 10% 63V
2734	5322 122 34099	470pF 10% 63V
2735	4822 126 13296	100nF 10% 16V
2737	4822 126 13296	100nF 10% 16V
2738	4822 126 13296	100nF 10% 16V
2741	4822 126 11585	22nF+80/- 20% 25V
2742	5322 122 32654	22nF 10% 63V
2743	4822 126 13296	100nF 10% 16V
2744	4822 126 13296	100nF 10% 16V
2760	4822 126 13296	100nF 10% 16V
2761	4822 124 22263	220µF 20% 25V
2762	4822 124 40246	4,7µF 20% 63V
2763	4822 124 40433	47µF 20% 25V
2765	4822 124 40433	47µF 20% 25V
2769	5322 122 34099	470pF 10% 63V
2770	5322 122 34099	470pF 10% 63V
2780	4822 124 81151	22µF 50V
2781	4822 122 33177	10nF 20% 50V
2782	5322 126 10223	4,7nF 10% 63V
2784	4822 121 51305	15nF 10% 50V
2785	4822 124 40242	1µF 20% 63V
2786	5322 122 32531	100pF 5% 50V
2787	4822 126 12105	33nF 5% 63V

RESISTORS

3601	4822 117 11449	2k2 1% 0,1W
3602	4822 051 20273	27k 5% 0,1W
3603	4822 117 11449	2k2 1% 0,1W
3604	4822 051 20563	56k 5% 0,1W
3605	4822 117 11449	2k2 1% 0,1W
3606	4822 051 20124	120k 5% 0,1W
3607	4822 116 52256	2k2 5% 0,5W
3608	4822 051 20273	27k 5% 0,1W
3609	4822 116 52256	2k2 5% 0,5W
3610	4822 051 20124	120k 5% 0,1W
3611	4822 116 52256	2k2 5% 0,5W
3612	4822 051 20563	56k 5% 0,1W
3613	4822 051 20273	27k 5% 0,1W
3614	4822 051 20273	27k 5% 0,1W
3616	4822 051 20822	8k2 5% 0,1W
3618	4822 051 20822	8k2 5% 0,1W

ELECTRICAL PARTS LIST - ETF5 DOLBY BOARD

3620	5322 100 11542	Trimmer 4k7 30% 0,1W
3622	5322 100 11542	Trimmer 4k7 30% 0,1W
3623	4822 051 20104	100k 5% 0,1W
3624	4822 051 20104	100k 5% 0,1W
3625	4822 051 10102	1k 2% 0,25W
3626	4822 051 10102	1k 2% 0,25W
3628	4822 051 20104	100k 5% 0,1W
3630	4822 051 20471	470R 5% 0,1W
3631	4822 117 10834	47k 1% 0,1W
3632	4822 117 10834	47k 1% 0,1W
3633	4822 051 20332	3k3 5% 0,1W
3634	4822 051 20332	3k3 5% 0,1W
3635	4822 100 11771	Trimmer 20k 30% 0,1W
3636	4822 100 11771	Trimmer 20k 30% 0,1W
3637	4822 051 20104	100k 5% 0,1W
3638	4822 051 20104	100k 5% 0,1W
3639	4822 051 20332	3k3 5% 0,1W
3640	4822 051 20332	3k3 5% 0,1W
3641	4822 100 11771	Trimmer 20k 30% 0,1W
3642	4822 100 11771	Trimmer 20k 30% 0,1W
3643	4822 051 20104	100k 5% 0,1W
3644	4822 051 20104	100k 5% 0,1W
3645	4822 051 20683	68k 5% 0,1W
3646	4822 051 20683	68k 5% 0,1W
3647	4822 051 20332	3k3 5% 0,1W
3648	4822 051 20332	3k3 5% 0,1W
3649	4822 051 20562	5k6 5% 0,1W
3650	4822 051 20562	5k6 5% 0,1W
3651	4822 051 10102	1k 2% 0,25W
3652	4822 050 11002	1k 1% 0,4W
3655	5322 100 11542	Trimmer 4k7 30% 0,1W
3656	5322 100 11542	Trimmer 4k7 30% 0,1W
3657	4822 051 10102	1k 2% 0,25W
3658	4822 051 10102	1k 2% 0,25W
3659	4822 051 20223	22k 5% 0,1W
3660	4822 051 20223	22k 5% 0,1W
3661	4822 051 20474	470k 5% 0,1W
3662	4822 051 20474	470k 5% 0,1W
3663	4822 051 20154	150k 5% 0,1W
3664	4822 051 20154	150k 5% 0,1W
3665	4822 051 20683	68k 5% 0,1W
3666	4822 051 20683	68k 5% 0,1W
3667	4822 051 20109	10R 5% 0,1W
3668	4822 051 20109	10R 5% 0,1W
3669	4822 051 20472	4k7 5% 0,1W
3670	4822 051 20472	4k7 5% 0,1W
3672	4822 051 20472	4k7 5% 0,1W
3674	4822 116 52283	4k7 5% 0,5W
3676	4822 117 10834	47k 1% 0,1W
3678	4822 117 10834	47k 1% 0,1W
3679	4822 117 10834	47k 1% 0,1W
3680	4822 117 10834	47k 1% 0,1W
3683	4822 117 10834	47k 1% 0,1W
3684	4822 117 10834	47k 1% 0,1W
3685	4822 116 52234	100k 5% 0,5W
3686	4822 051 20104	100k 5% 0,1W
3689	4822 051 20124	120k 5% 0,1W
3690	4822 116 83882	39k 5% 0,5W
3691	4822 117 10833	10k 1% 0,1W
3692	4822 051 20683	68k 5% 0,1W
3693	4822 116 52199	68R 5% 0,5W
3694	4822 052 10109 ⚠	10R 5% 0,33W
3695	4822 051 20689	68R 5% 0,1W
3701	4822 117 11503	220R 1% 0.1W
3702	4822 117 11503	220R 1% 0.1W
3703	4822 117 11503	220R 1% 0.1W
3704	4822 117 11503	220R 1% 0.1W
3705	4822 117 11503	220R 1% 0.1W
3706	4822 117 11503	220R 1% 0.1W
3707	4822 051 20101	100R 5% 0,1W
3708	4822 051 20101	100R 5% 0,1W
3709	4822 051 20229	22R 5% 0,1W
3710	4822 051 20229	22R 5% 0,1W
3711	4822 051 20104	100k 5% 0,1W
3712	4822 051 20104	100k 5% 0,1W
3713	4822 051 20121	120R 5% 0,1W
3714	4822 051 20121	120R 5% 0,1W
3715	4822 051 10102	1k 2% 0,25W
3716	4822 051 10102	1k 2% 0,25W
3717	4822 051 20392	3k9 5% 0,1W
3718	4822 051 20392	3k9 5% 0,1W
3719	4822 051 20822	8k2 5% 0,1W
3720	4822 051 20822	8k2 5% 0,1W
3721	4822 051 20562	5k6 5% 0,1W
3722	4822 051 20562	5k6 5% 0,1W
3723	4822 117 11383	12k 1% 0,1W
3724	4822 117 11383	12k 1% 0,1W
3727	4822 051 20562	5k6 5% 0,1W
3728	4822 051 20562	5k6 5% 0,1W
3729	4822 117 12955	2k7 1% 0,1W
3730	4822 117 12955	2k7 1% 0,1W
3731	4822 051 20562	5k6 5% 0,1W
3732	4822 051 20562	5k6 5% 0,1W
3733	4822 051 20562	5k6 5% 0,1W
3734	4822 051 20562	5k6 5% 0,1W
3735	4822 051 20153	15k 5% 0,1W
3736	4822 051 20153	15k 5% 0,1W
3737	4822 051 20332	3k3 5% 0,1W
3738	4822 051 20332	3k3 5% 0,1W
3739	4822 051 20472	4k7 5% 0,1W
3740	4822 117 10834	47k 1% 0,1W
3741	4822 117 11454	820R 1% 0,1W
3742	4822 117 11454	820R 1% 0,1W
3743	4822 051 20122	1k2 5% 0,1W

ELECTRICAL PARTS LIST - ETF5 DOLBY BOARD

RESISTORS

3744	4822 051 20122	1k2 5% 0,1W
3745	4822 051 20392	3k9 5% 0,1W
3746	4822 051 20392	3k9 5% 0,1W
3748	4822 117 11449	2k2 1% 0,1W
3749	4822 117 10834	47k 1% 0,1W
3751	4822 117 10833	10k 1% 0,1W
3752	4822 051 20104	100k 5% 0,1W
3753	4822 051 20104	100k 5% 0,1W
3754	4822 051 20333	33k 5% 0,1W
3756	4822 051 20224	220k 5% 0,1W
3757	4822 051 20224	220k 5% 0,1W
3758	4822 117 10833	10k 1% 0,1W
3759	4822 117 10833	10k 1% 0,1W
3760	4822 051 20121	120R 5% 0,1W
3761	4822 116 83864	10k 5% 0,5W
3762	4822 117 11454	820R 1% 0,1W
3763	4822 051 20154	150k 5% 0,1W
3764	4822 116 83872	220R 5% 0,5W
3765	4822 051 20393	39k 5% 0,1W
3766	4822 051 20475	4M7 5% 0,1W
3767	4822 051 20475	4M7 5% 0,1W
3768	4822 117 10833	10k 1% 0,1W
3769	4822 117 10833	10k 1% 0,1W
3770	4822 117 11139	1k5 1% 0,1W
3771	4822 051 20122	1k2 5% 0,1W
3772	4822 051 20562	5k6 5% 0,1W
3773	5322 100 11542	Trimmer 4k7 30% 0,1W
3774	4822 051 20822	8k2 5% 0,1W
3775	4822 051 20478	4R7 5% 0,1W
3776	4822 117 11507	6k8 1% 0,1W
3777	4822 117 10353	150R 1% 0,1W
3778	4822 052 10688 ⚠	6R8 5% 0,33W
3779	4822 051 20334	330k 5% 0,1W
3780	4822 051 20105	1M 5% 0,1W
3781	4822 051 20475	4M7 5% 0,1W
3782	4822 051 20153	15k 5% 0,1W
3783	4822 051 20472	4k7 5% 0,1W
3784	4822 051 20472	4k7 5% 0,1W
3785	5322 100 11539	Trimmer 100k 30% 0,1W
3786	4822 051 20223	22k 5% 0,1W
3787	4822 051 20105	1M 5% 0,1W
3788	4822 051 20105	1M 5% 0,1W
3789	4822 117 10834	47k 1% 0,1W
4601	4822 051 20008	0R Jumper 0805
4602	4822 051 20008	0R Jumper 0805
4603	4822 051 20008	0R Jumper 0805
4604	4822 051 20008	0R Jumper 0805
4605	4822 051 20008	0R Jumper 0805
4606	4822 051 20008	0R Jumper 0805
4607	4822 051 20008	0R Jumper 0805
4608	4822 051 20008	0R Jumper 0805
4696	4822 051 20008	0R Jumper 0805
4610	4822 051 20008	0R Jumper 0805
4701	4822 051 20008	0R Jumper 0805
4702	4822 051 20008	0R Jumper 0805
4703	4822 051 20008	0R Jumper 0805
4704	4822 051 20008	0R Jumper 0805
4705	4822 051 20008	0R Jumper 0805
4706	4822 051 20008	0R Jumper 0805
4707	4822 051 20008	0R Jumper 0805
4708	4822 051 20008	0R Jumper 0805
4709	4822 051 20008	0R Jumper 0805
4710	4822 051 20008	0R Jumper 0805
4711	4822 051 20008	0R Jumper 0805
4712	4822 051 20008	0R Jumper 0805
4713	4822 051 20008	0R Jumper 0805
4714	4822 051 20008	0R Jumper 0805
4715	4822 051 20008	0R Jumper 0805
4716	4822 051 20008	0R Jumper 0805
4717	4822 051 20008	0R Jumper 0805
4718	4822 051 20008	0R Jumper 0805
4719	4822 051 20008	0R Jumper 0805
4720	4822 051 20008	0R Jumper 0805
4721	4822 051 20008	0R Jumper 0805
4722	4822 051 20008	0R Jumper 0805
4723	4822 051 20008	0R Jumper 0805
4724	4822 051 20008	0R Jumper 0805
4725	4822 051 20008	0R Jumper 0805
4726	4822 051 20008	0R Jumper 0805
4727	4822 051 20008	0R Jumper 0805
4728	4822 051 20008	0R Jumper 0805
4729	4822 051 20008	0R Jumper 0805
4730	4822 051 20008	0R Jumper 0805
4731	4822 051 20008	0R Jumper 0805
4732	4822 051 20008	0R Jumper 0805
4733	4822 051 20008	0R Jumper 0805
4734	4822 051 20008	0R Jumper 0805
4735	4822 051 20008	0R Jumper 0805
4736	4822 051 20008	0R Jumper 0805
4737	4822 051 20008	0R Jumper 0805
4738	4822 051 20008	0R Jumper 0805
4739	4822 051 20008	0R Jumper 0805
4740	4822 051 20008	0R Jumper 0805
4741	4822 051 20008	0R Jumper 0805
4742	4822 051 20008	0R Jumper 0805
4783	4822 051 20008	0R Jumper 0805

COILS & FILTERS

5631	4822 156 21725	MPX Filter LXD-210
5632	4822 156 21725	MPX Filter LXD-210
5701	4822 156 21721	Fixed Inductor 2µ2 10%
5702	4822 156 21721	Fixed Inductor 2µ2 10%
5703	4822 156 20946	OSC COIL 100kHz

ELECTRICAL PARTS LIST - ETF5 DOLBY BOARD

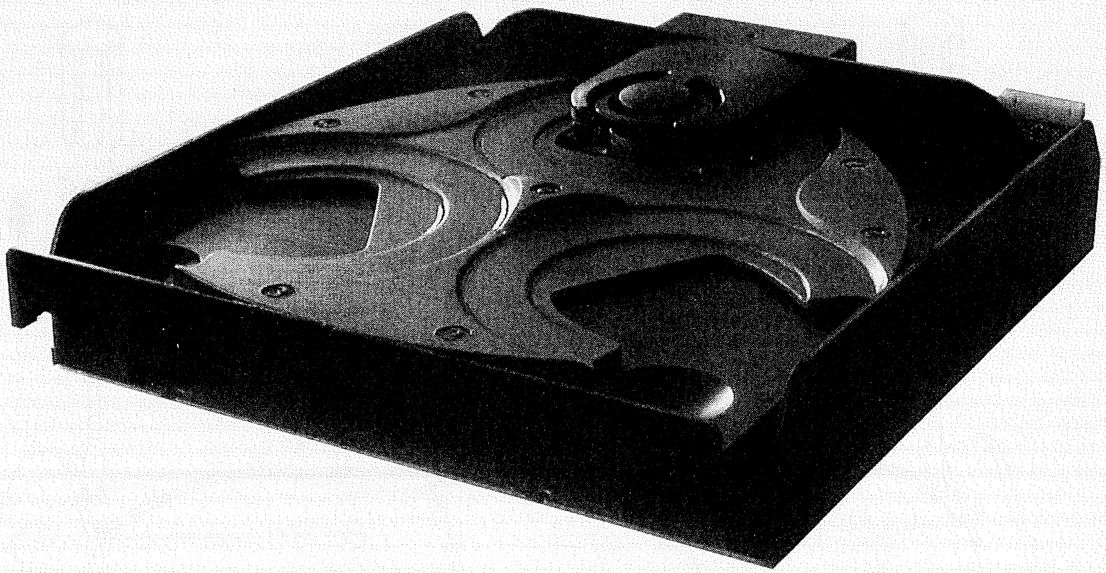
DIODES

6611	4822 130 31878	1N4003G
6612	4822 130 31878	1N4003G
6614	4822 130 30621	1N4148
6770	4822 130 30621	1N4148
6771	4822 130 30621	1N4148
6772	4822 130 30621	1N4148
6773	4822 130 30621	1N4148
6774	4822 130 30621	1N4148
6775	4822 130 30621	1N4148
6776	4822 130 30621	1N4148
6777	4822 130 34382	BZX79-C8V2
6778	4822 130 30621	1N4148
6782	4822 130 30621	1N4148
6785	4822 130 30621	1N4148
6786	4822 130 30621	1N4148

TRANSISTORS & INTEGRATED CIRCUITS

7610	5322 209 11306	HEF4094BT
7612	5322 130 60845	BC807-25
7613	5322 130 60845	BC807-25
7614	5322 130 60845	BC807-25
7616	5322 130 60508	BC857B
7618	4822 130 60511	BC847B
7619	4822 130 60511	BC847B
7620	4822 130 60511	BC847B
7622	4822 130 60511	BC847B
7623	4822 130 60511	BC847B
7624	4822 130 60511	BC847B
7630	4822 209 90406	CXA1101M
7631	4822 130 60511	BC847B
7632	4822 130 60511	BC847B
7633	4822 130 60511	BC847B
7634	4822 130 60511	BC847B
7635	4822 130 60511	BC847B
7636	4822 130 60511	BC847B
7637	4822 130 60511	BC847B
7638	4822 130 60511	BC847B
7640	4822 209 83357	NJM4560M
7710	4822 209 32919	HEF4952BT
7720	4822 209 32918	AN7318S
7730	4822 209 32919	HEF4952BT
7740	4822 209 32919	HEF4952BT
7780	4822 130 60511	BC847B
7781	4822 130 60511	BC847B
7782	4822 130 44568	BC557B
7783	4822 130 60511	BC847B
7784	5322 130 60508	BC857B
7785	4822 130 63494	J111
7786	4822 130 63494	J111
7787	4822 130 60511	BC847B
7788	4822 130 60511	BC847B
7789	4822 130 60511	BC847B
7790	4822 130 60511	BC847B
7791	4822 130 60511	BC847B
7792	4822 130 60511	BC847B

Note: Only the parts mentioned in this list are normal service spare parts.



3CDC Module

(3 Disc Carrousel Changer)

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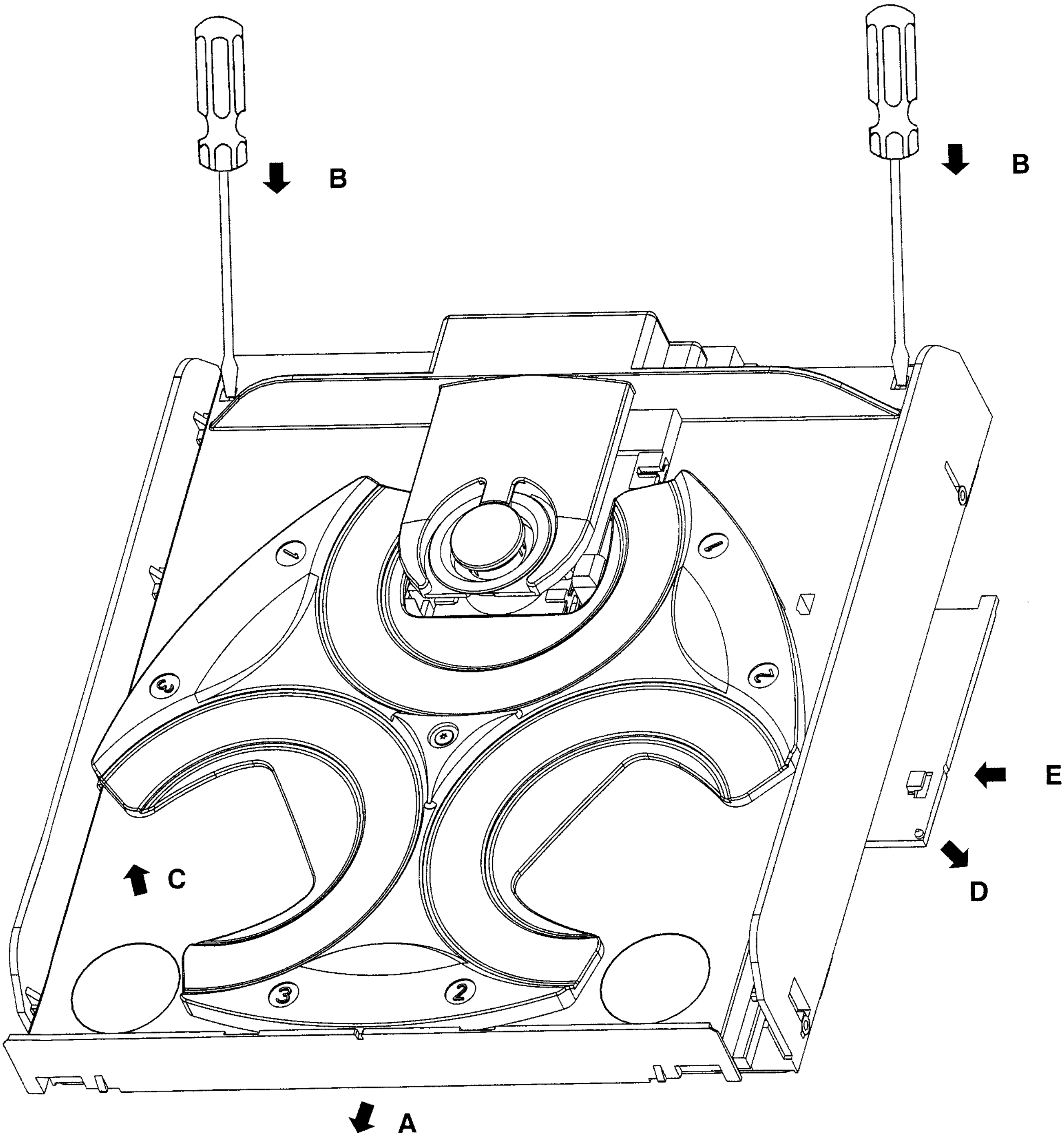
Demounting Hints



Demounting of Drawer

→ **A** Pull drawer outwards
→ **B** Unlock drawer with screwdriver
→ **C** Lift drawer to demount from chassis

Demounting of Flex Plate

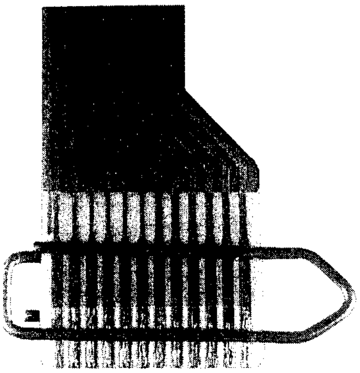
→ **D** Lift plate to unlock pin from bottom plate
→ **E** Move plate inwards to demount from bottom plate

Servicing Hints

Replacement of CD Drive

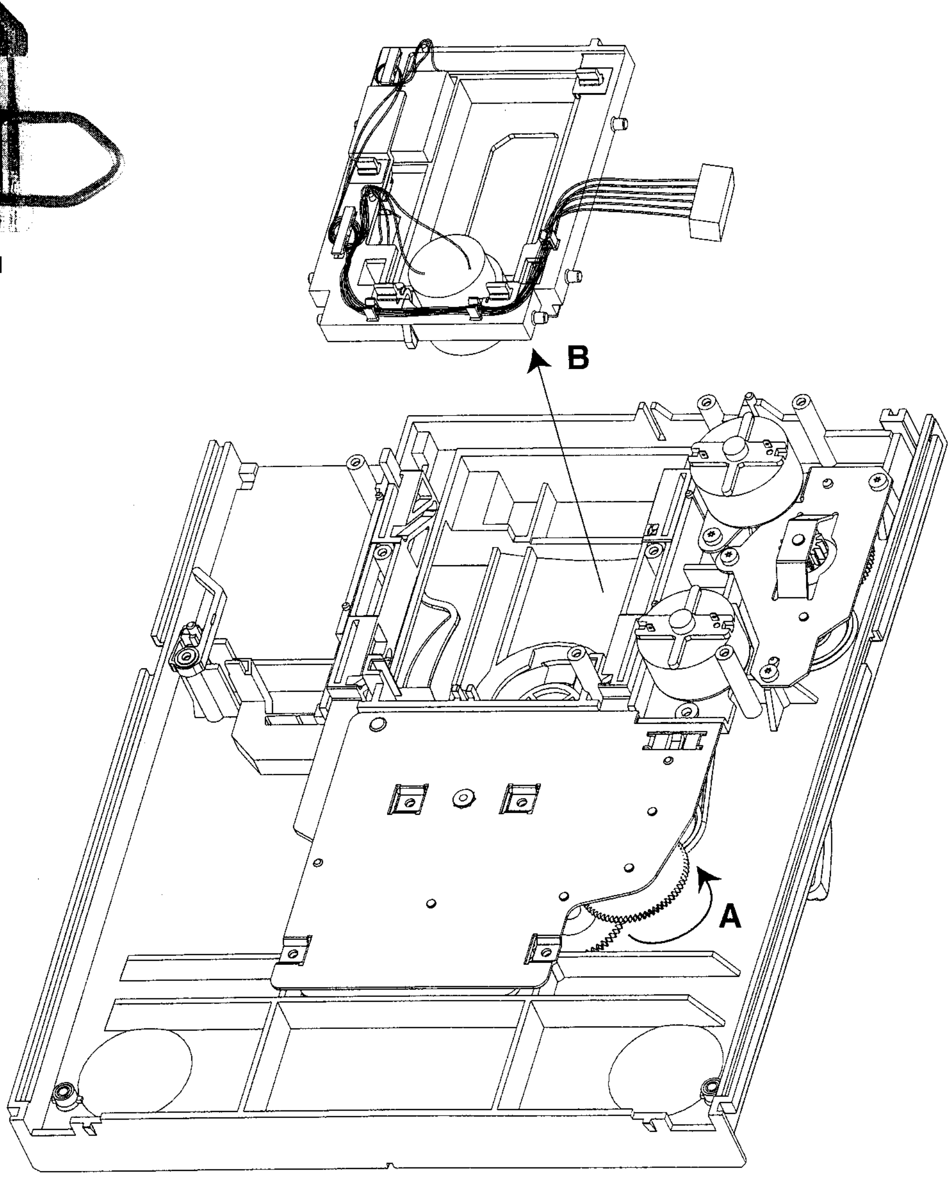
See also exploded view of changer mechanism.

1. Demount flex plate (pos 140).
2. Demount printed circuit board: remove 6 screws and desolder lips of tray motor and carrousel motor.
3. Disconnect flexfoil and JST connector of CD drive from Printed circuit board. Shortcircuit the flexfoil with a paperclip to protect the laser against ESD.



CD drive flex foil

4. Remove 2 screws (pos 107,108) and demount CD drive lockings (pos 105,106).
5. Turn gearwheel (pos 42) of disc change mechanism by finger to move CD drive support in upper position as shown in picture below Ⓐ.
6. Demount CD drive support (pos 95) Ⓑ.
7. Replace CD drive (pos 100). The wire tree of JST connector has to be desoldered and resoldered on the new CD drive again.

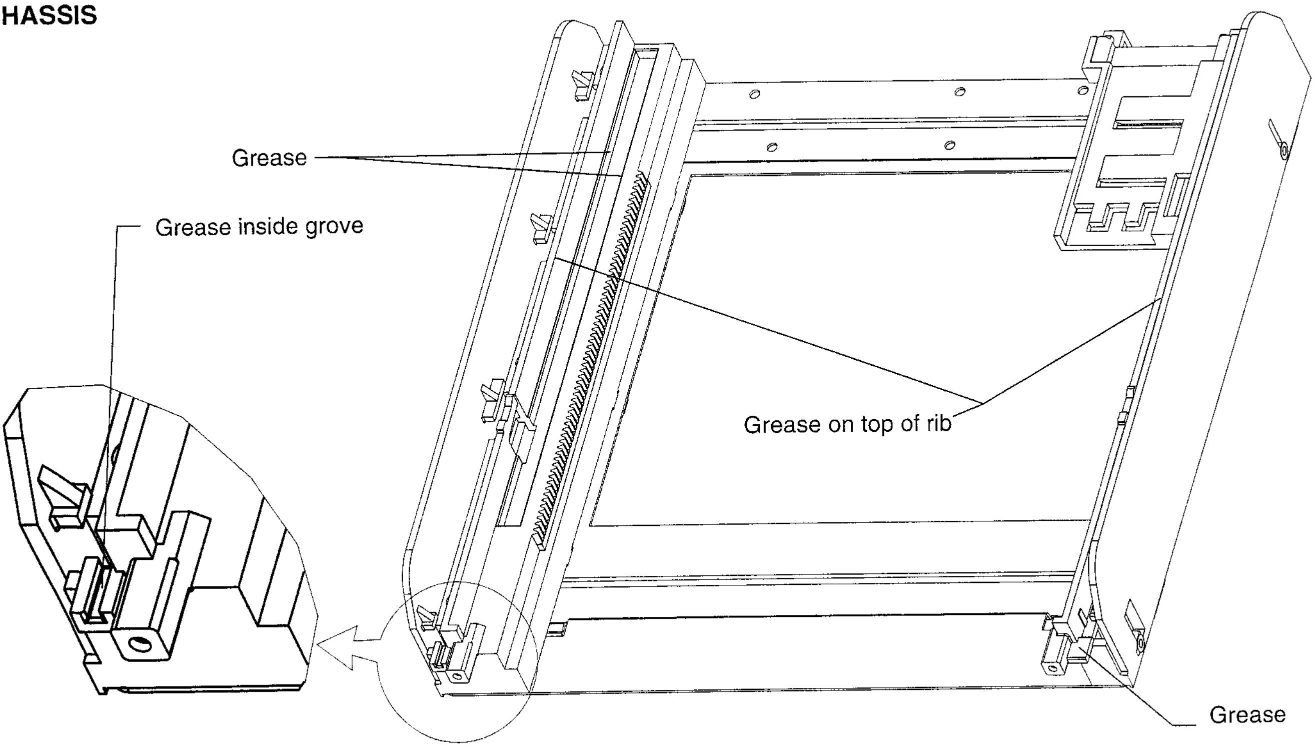


Mounting of Carrousel

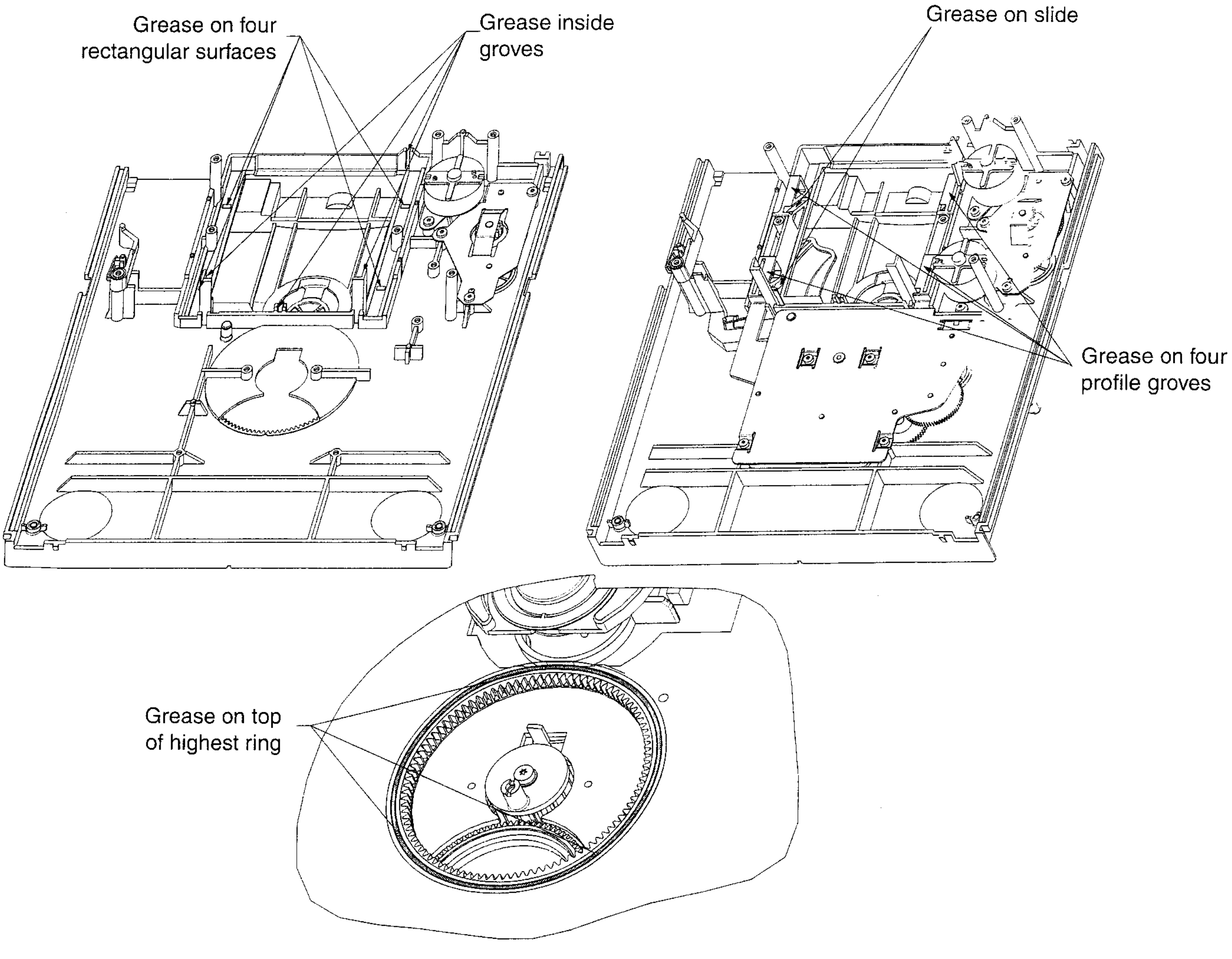
1. Turn gearwheel (pos 42) of disc change mechanism by finger until CD drive is in play position.
2. Mount carrousel (pos 115) so that disc is positioned right on turntable. Carrousel position number doesn´t matter.

Lubrication Instructions

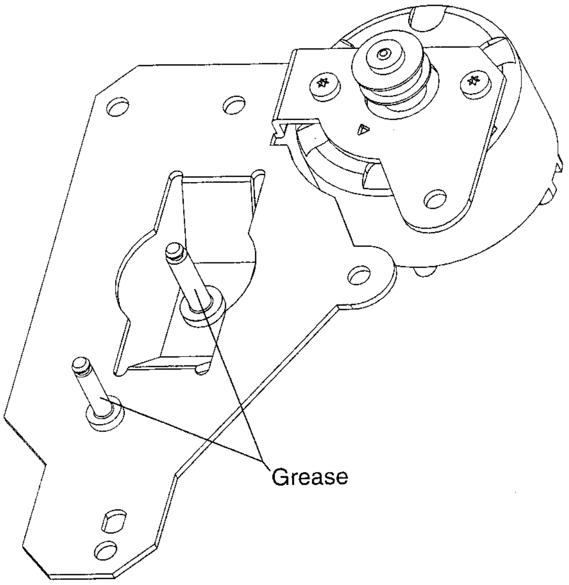
CHASSIS


Grease
Grease inside grove
Grease on top of rib
Grease

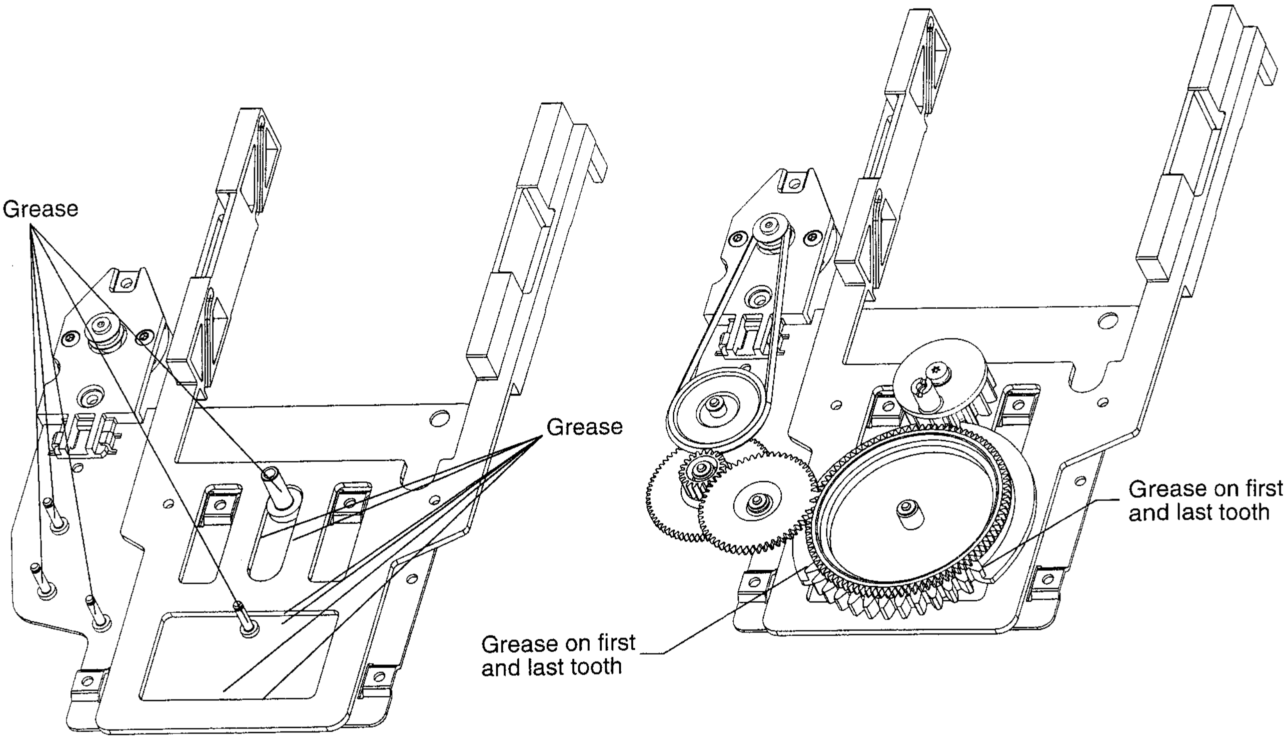
DRAWER


Grease on four rectangular surfaces
Grease inside groves
Grease on slide
Grease on four profile groves
Grease on top of highest ring

DRAWER MECHANISM



DISC CHANGE MECHANISM


Grease
Grease
Grease on first and last tooth
Grease on first and last tooth

Use only grease **Polylub GLY 801** service codenumber 4822 390 10136

WARNING

CHARGED CAPACITORS ON THE SERVO BOARD MAY DAMAGE THE CD DRIVE ELECTRONICS WHEN CONNECTING A NEW CDM MECHANISM. THAT´S WHY, BESIDES THE SAFETY MEASURES LIKE
- ***SWITCH OFF POWER SUPPLY***
- ***ESD PROTECTION***

ADDITIONAL ACTIONS MUST BE TAKEN BY THE REPAIR TECHNICIAN.

The following steps have to be done when replacing the CDM mechanism:

1. Disconnect old CD drive flexfoil from printed board
2. Connect paperclip to CD drive flexfoil to short-circuit flexfoil (fig.1)
3. Short-circuit printed board with **brass-sheet (4822 321 11197)** plugged into the flexfoil connector (fig.2)
4. Remove old CD drive mechanism
5. Position new CD mechanism in its studs
6. Remove short-circuit from printed board connector
7. Remove short-circuit from flexfoil of new CD drive
8. Connect new flexfoil to print connector (fig.3)

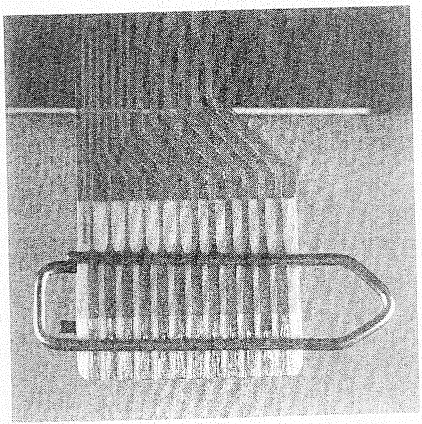


fig.1

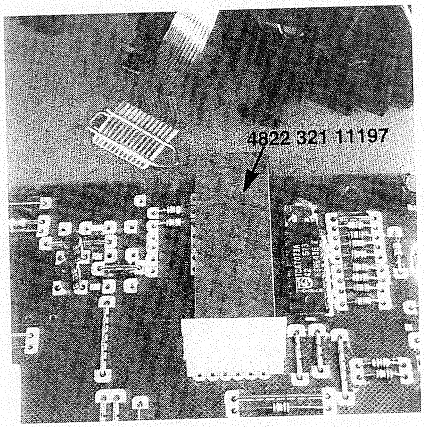


fig.2

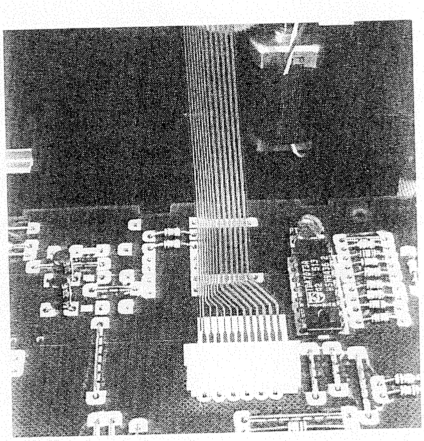
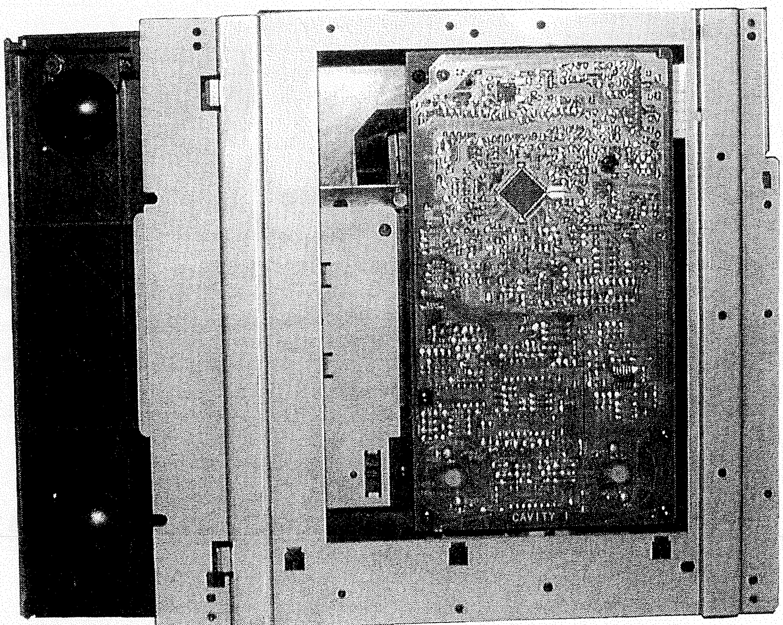
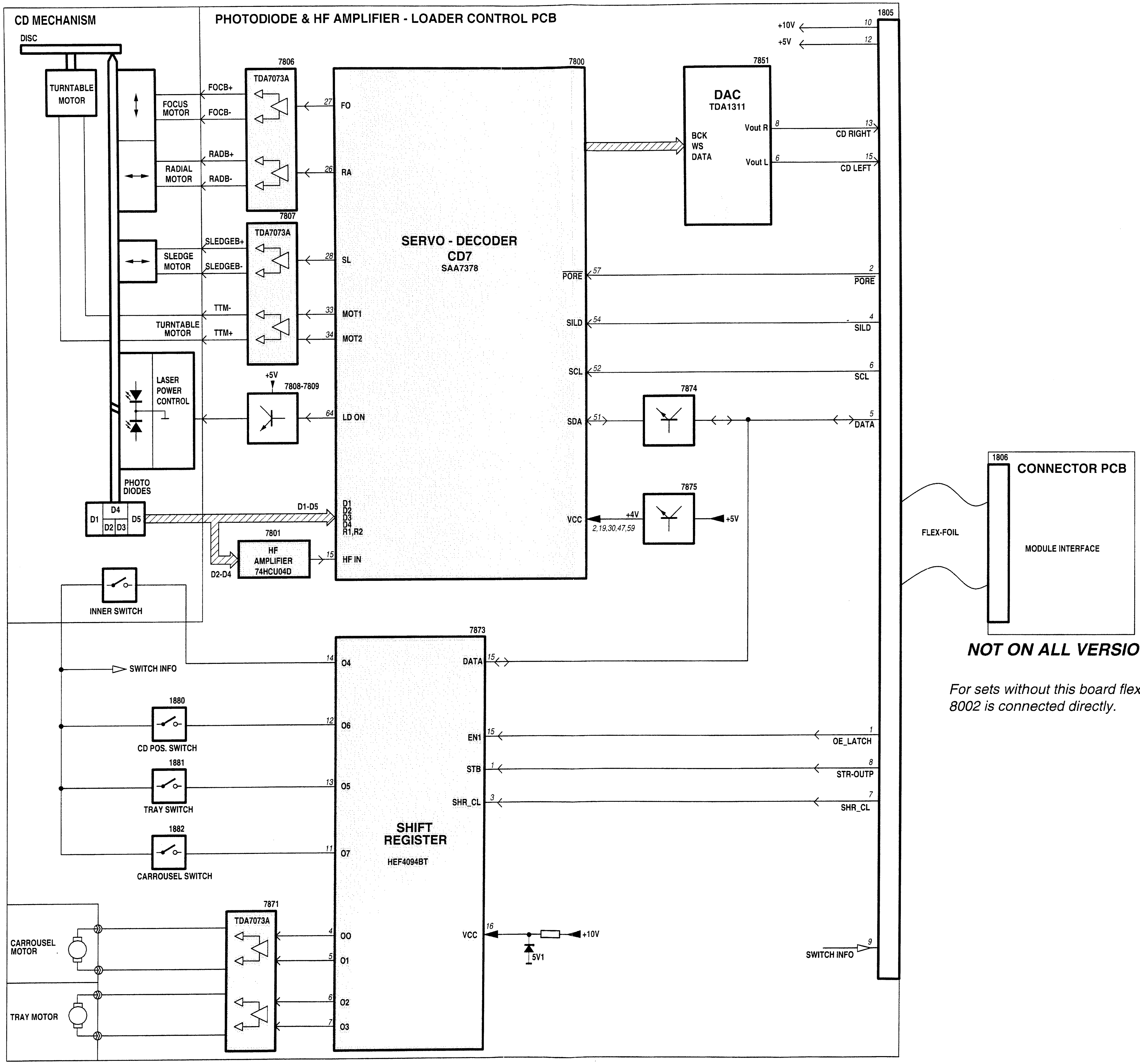


fig.3

Service Position



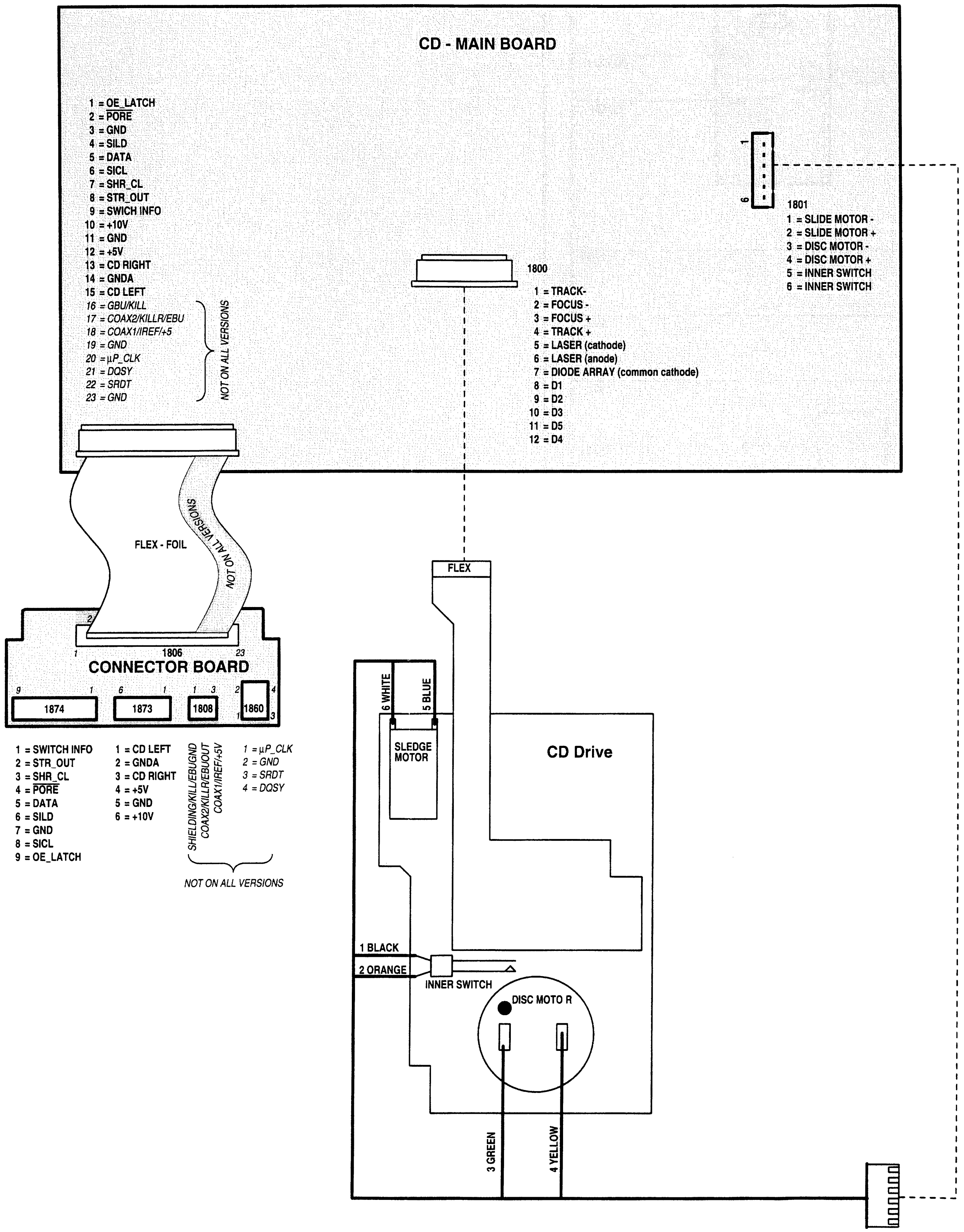
Blockdiagram


CD MECHANISM
DISC
TURNTABLE MOTOR
FOCUS MOTOR
RADIAL MOTOR
SLEDGE MOTOR
TURNTABLE MOTOR
LASER POWER CONTROL
PHOTO DIODES
D1
D2
D3
D4
D5
INNER SWITCH
PHOTODIODE & HF AMPLIFIER - LOADER CONTROL PCB
FOCB+
FOCB-
RADB+
RADB-
SLEDGEB+
SLEDGEB-
TTM-
TTM+
7806
TDA7073A
7807
TDA7073A
+5V
7808-7809
D1-D5
D2-D4
7801
HF AMPLIFIER 74HCU04D
7800
SERVO - DECODER
CD7
SAA7378
FO
RA
SL
MOT1
MOT2
LD ON
D1
D2
D3
D4
R1,R2
HF IN
PORE
SILD
SCL
SDA
VCC
27
26
28
33
34
64
15
57
54
52
51
2,19,30,47,59
+4V
+5V
7874
7875
7851
DAC
TDA1311
BCK
WS
DATA
Vout R
Vout L
8
6
1805
+10V
+5V
10
12
13
CD RIGHT
15
CD LEFT
2
PORE
4
SILD
6
SCL
5
DATA
SWITCH INFO
1880
CD POS. SWITCH
1881
TRAY SWITCH
1882
CARROUSEL SWITCH
7873
SHIFT REGISTER
HEF4094BT
O4
O6
O5
O7
14
12
13
11
DATA
15
EN1
15
STB
1
SHR_CL
3
1
OE_LATCH
8
STR-OUTP
7
SHR_CL
VCC
16
+10V
5V1
9
SWITCH INFO
7871
TDA7073A
CARROUSEL MOTOR
TRAY MOTOR
4
5
6
7
O0
O1
O2
O3
FLEX-FOIL
1806
CONNECTOR PCB
MODULE INTERFACE

NOT ON ALL VERSIONS

For sets without this board flexfoil 8002 is connected directly.

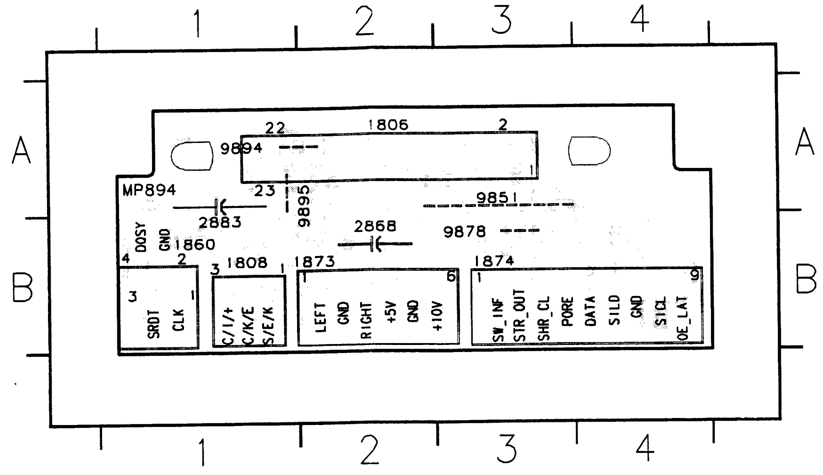
Wiring diagram


CD - MAIN BOARD
1 = OE_LATCH
2 = PORE
3 = GND
4 = SILD
5 = DATA
6 = SICL
7 = SHR_CL
8 = STR_OUT
9 = SWICH INFO
10 = +10V
11 = GND
12 = +5V
13 = CD RIGHT
14 = GNDA
15 = CD LEFT
16 = GBU/KILL
17 = COAX2/KILLR/EBU
18 = COAX1/IREF/+5
19 = GND
20 = µP_CLK
21 = DQSY
22 = SRDT
23 = GND
NOT ON ALL VERSIONS
1800
1 = TRACK-
2 = FOCUS -
3 = FOCUS +
4 = TRACK +
5 = LASER (cathode)
6 = LASER (anode)
7 = DIODE ARRAY (common cathode)
8 = D1
9 = D2
10 = D3
11 = D5
12 = D4
1
6
1801
1 = SLIDE MOTOR -
2 = SLIDE MOTOR +
3 = DISC MOTOR -
4 = DISC MOTOR +
5 = INNER SWITCH
6 = INNER SWITCH
FLEX - FOIL
NOT ON ALL VERSIONS
2
1
1806
23
CONNECTOR BOARD
9
1
1874
6
1
1873
1
3
1808
2
4
1
1860
3
1 = SWITCH INFO
2 = STR_OUT
3 = SHR_CL
4 = PORE
5 = DATA
6 = SILD
7 = GND
8 = SICL
9 = OE_LATCH
1 = CD LEFT
2 = GNDA
3 = CD RIGHT
4 = +5V
5 = GND
6 = +10V
SHIELDING/KILL/EBUGND
COAX2/KILLR/EBUOUT
COAX1/IREF/+5V
1 = µP_CLK
2 = GND
3 = SRDT
4 = DQSY
NOT ON ALL VERSIONS
FLEX
6 WHITE
5 BLUE
SLEDGE MOTOR
CD Drive
1 BLACK
2 ORANGE
INNER SWITCH
DISC MOTO R
3 GREEN
4 YELLOW

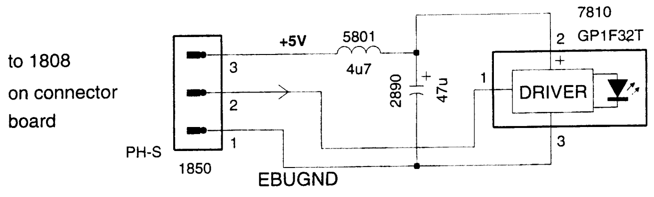
Remarks

Connector Board Copperside view

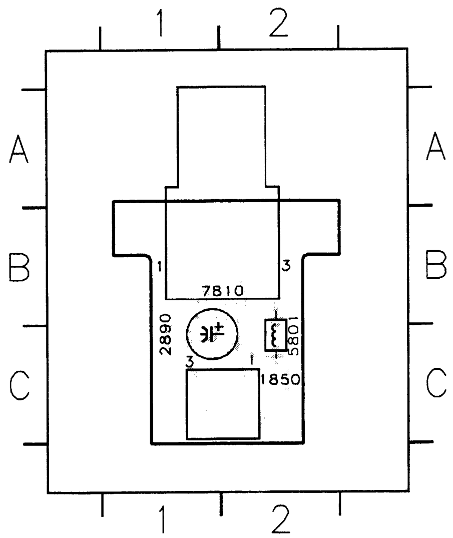
1806	A2	1873	B2	2883	B1	9894	A1
1808	B1	1874	B3	9851	A3	9895	A2
1860	B1	2868	B2	9878	B3	MP894	A1


1
2
3
4
A
B
22
1806
2
9894
1
MP894
23
9895
2883
9851
2868
9878
DOSY
GND
1860
4
2
3
1808
1
1873
6
1874
9
3
1
SRDT
CLK
C/I/+
C/K/E
S/E/K
LEFT
GND
RIGHT
+5V
GND
+10V
SW_INF
STR_OUT
SHR_CL
PORE
DATA
SILD
GND
SICL
OE_LAT

Circuit Diagram Optical out


to 1808
on connector
board
PH-S
1850
3
2
1
+5V
5801
4u7
2890
+
47u
EBUGND
7810
GP1F32T
2
+
1
DRIVER
3

Component Layout Optical out

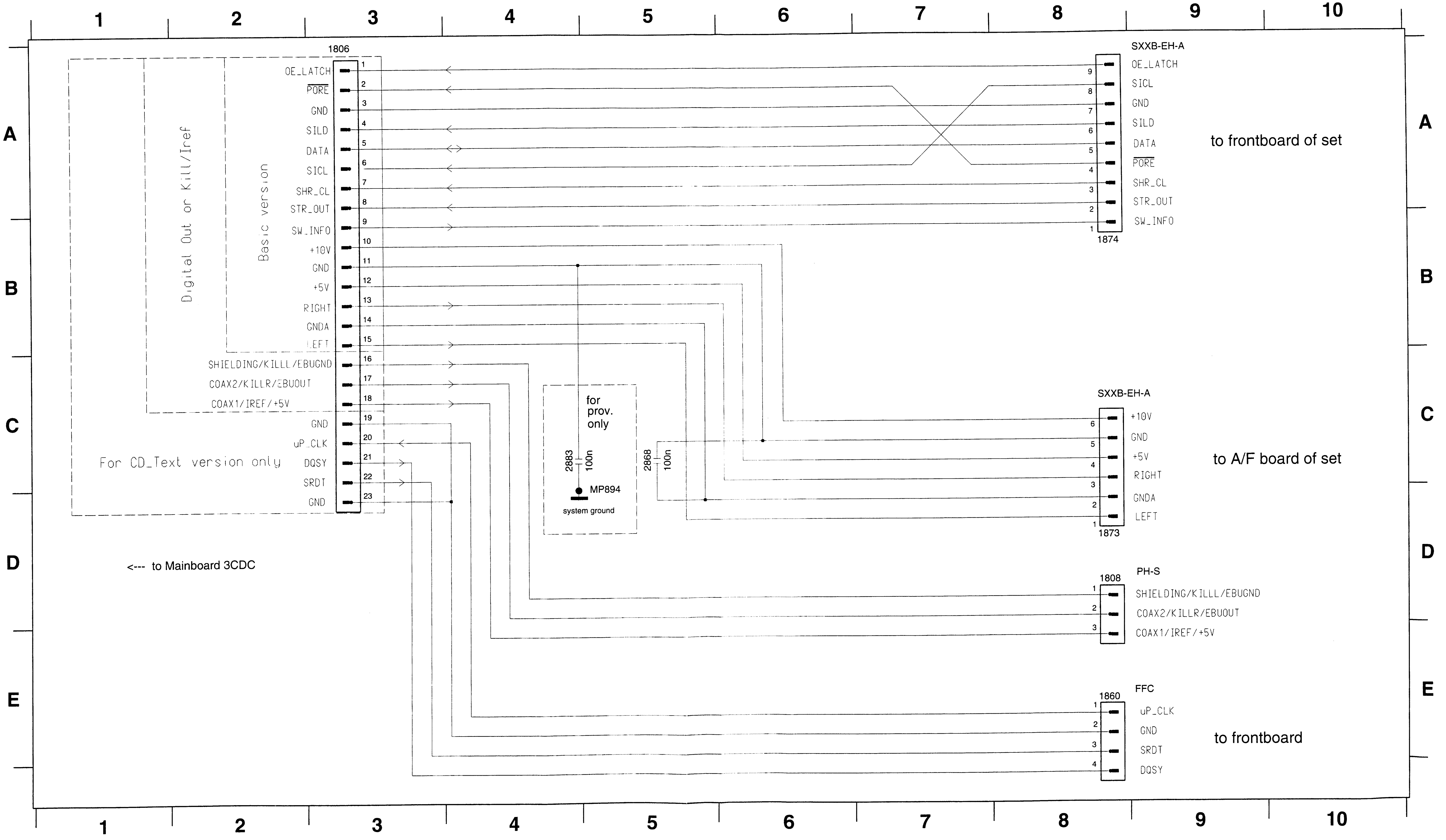

1
2
A
B
C
1
3
7810
2890
5801
3
1
1850

1850	C2
2890	C1
5801	C2
7810	B1

NOT ON ALL VERSIONS

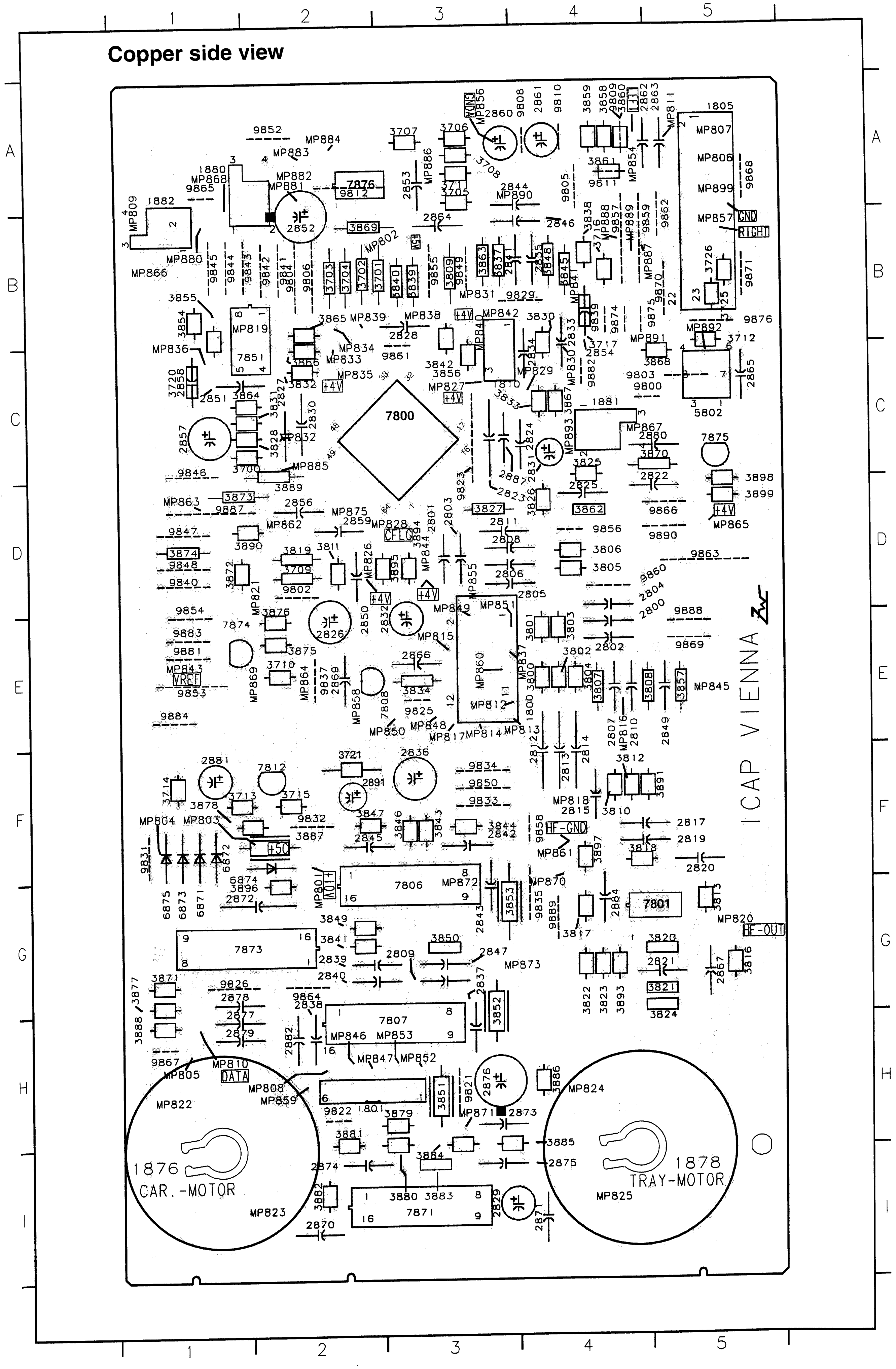
Circuit diagram Connector Board

1806	A3	1860	E8	1874	B8	2883	C4
1808	D8	1873	D8	2868	C5		


1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
1806
OE_LATCH
PORE
GND
SILD
DATA
SICL
SHR_CL
STR_OUT
SW_INFO
+10V
GND
+5V
RIGHT
GNDA
LEFT
SHIELDING/KILLL/EBUGND
COAX2/KILLR/EBUOUT
COAX1/IREF/+5V
GND
uP_CLK
DQSY
SRDT
GND
Digital Out or Kill/Iref
Basic version
For CD_Text version only
<--- to Mainboard 3CDC
SXXB-EH-A
OE_LATCH
SICL
GND
SILD
DATA
PORE
SHR_CL
STR_OUT
SW_INFO
1874
to frontboard of set
for prov. only
2883
100n
MP894
system ground
2868
100n
SXXB-EH-A
+10V
GND
+5V
RIGHT
GNDA
LEFT
1873
to A/F board of set
1808
PH-S
SHIELDING/KILLL/EBUGND
COAX2/KILLR/EBUOUT
COAX1/IREF/+5V
1860
FFC
uP_CLK
GND
SRDT
DQSY
to frontboard

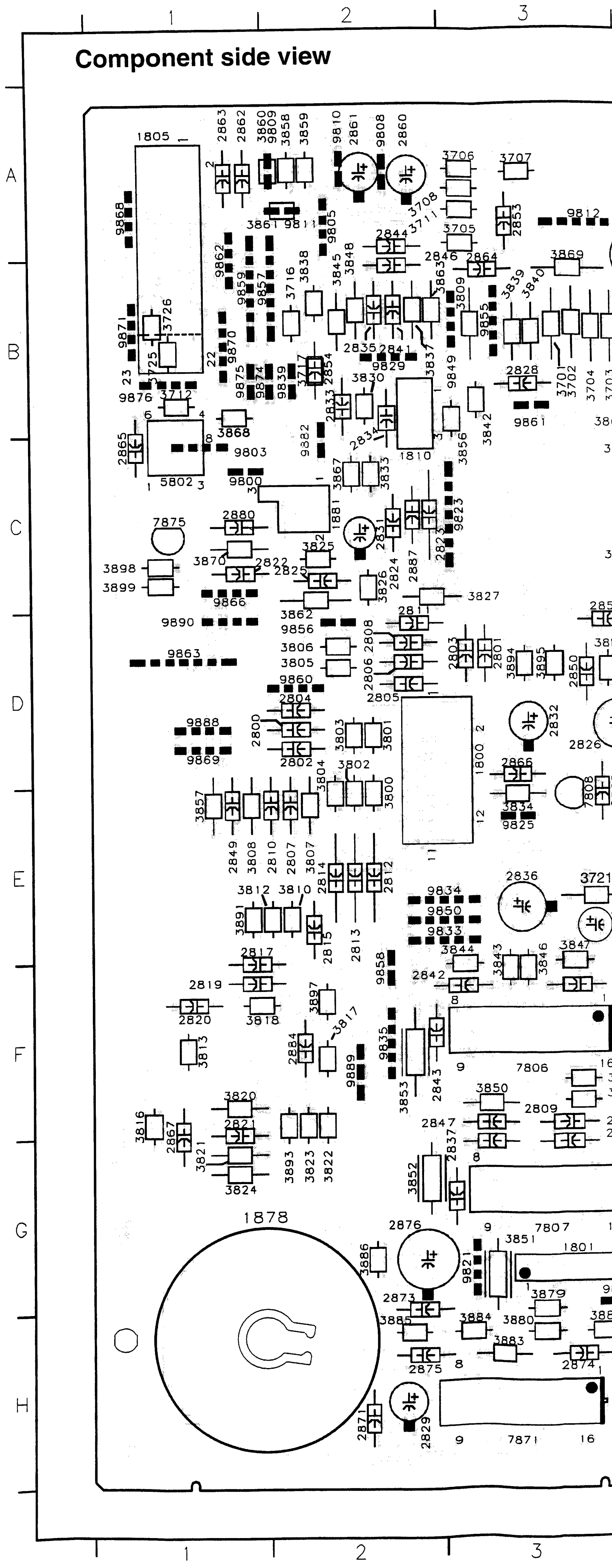
NOT ON ALL VERSIONS

Copper side view

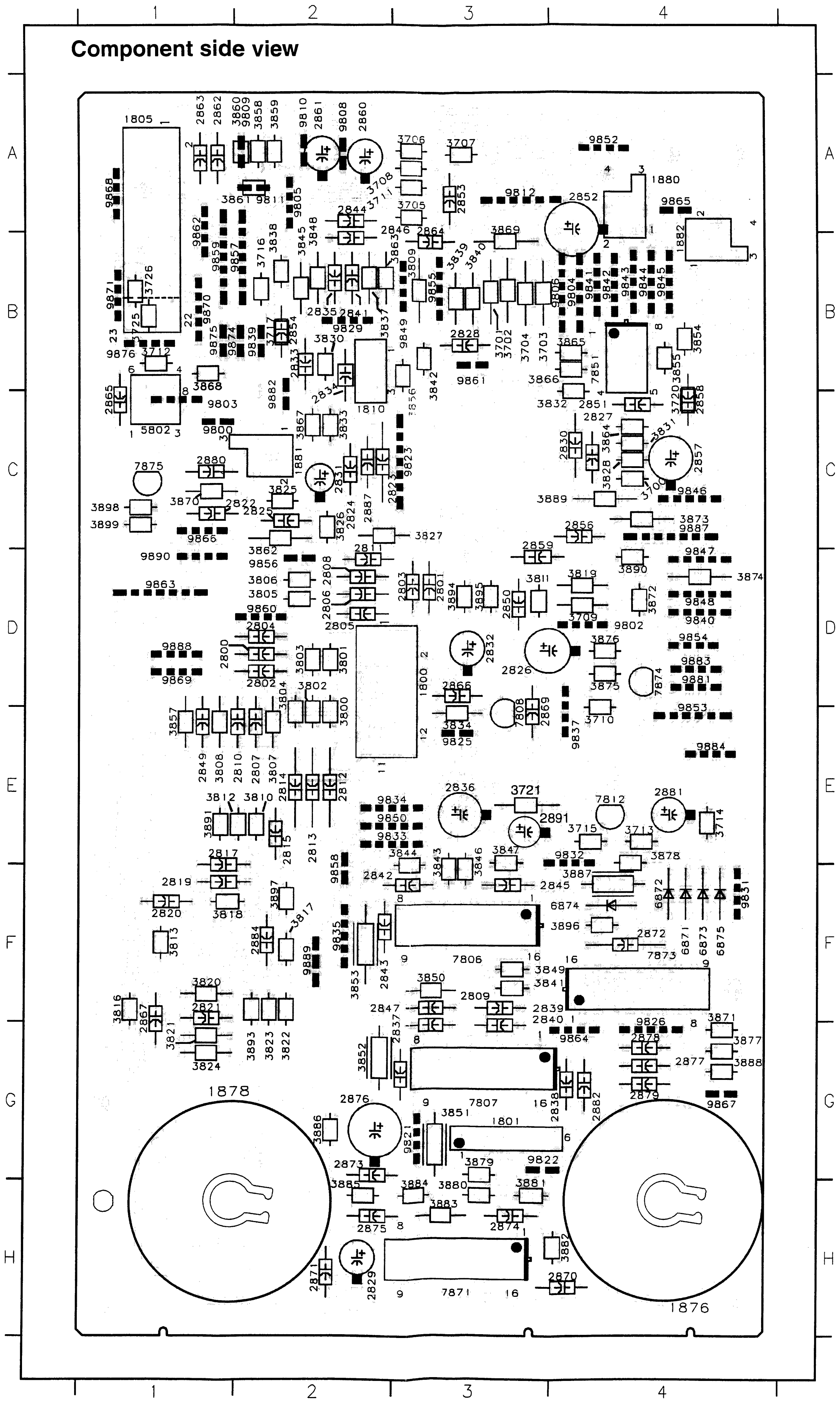

1
2
3
4
5
A
B
C
D
E
F
G
H
I
7800
7801
7806
7807
7871
7873
7851
1805
1876
CAR.-MOTOR
1878
TRAY-MOTOR
ICAP VIENNA
HF-OUT
HF-GND
DATA
RIGHT
GND
VREF
+4V
+5C
CFLG
MP807
MP806
MP899
MP857
MP824
MP825
MP822
MP823

1800	E3
1801	H2
1805	B5
1810	C3
1876	I1
1878	I4
1880	B2
1881	C4
1882	B1
2800	D4
2801	D3
2802	E4
2803	D3
2804	D4
2805	D3
2806	D3
2807	E4
2808	D3
2809	G3
2810	E4
2811	D3
2812	F4
2813	F4
2814	F4
2815	F4
2817	F4
2819	F4
2820	F5
2821	G5
2822	D5
2823	C3
2824	C4
2825	D4
2826	D2
2827	C2
2828	B3
2829	I3
2830	C2
2831	C4
2832	E3
2833	B4
2834	C3
2835	B4
2836	F3
2837	H3
2838	H2
2839	G2
2840	G2
2841	B3
2842	F3
2843	G3
2844	B4
2845	F2
2846	B4
2847	G3
2849	E5
2850	D2
2851	C1
2852	A2
2853	A3
2854	B4
2856	D2
2857	C1
2858	C1
2859	D2
2860	A3
2861	A4
2862	A4
2863	A5
2864	B3
2865	C5
2866	E3
2867	G5
2869	E2
2870	I2
2871	I4
2872	G2
2873	H3
2874	I2
2875	I3
2876	H3
2877	G1
2878	G1
2879	H1
2880	C5
2881	F1
2882	H2
2884	G4
2887	C3
3700	C1
3701	B3
3702	B2
3703	B2
3704	B2
3705	A3
3706	A3
3707	A3
3708	A3
3709	D2
3710	E2
3711	A3
3712	B5
3713	F1
3714	F1
3715	F2
3716	B4
3717	B4
3720	C1
3725	B5
3726	B5
3800	E4
3801	E4
3802	E4
3803	E4
3804	E4
3805	D4
3806	D4
3807	E4
3808	E4
3809	B3
3810	F4
3811	D2
3812	F4
3813	G5
3816	G5
3817	G4
3818	F4
3819	D2
3820	G5
3821	G5
3822	G4
3823	G4
3824	G5
3825	C4
3826	D4
3827	D3
3828	C1
3830	B4
3831	C1
3832	C2
3833	C4
3834	E3
3837	B3
3838	B4
3839	B3
3840	B3
3841	G2
3842	B3
3843	F3
3844	F3
3845	B4
3846	F3
3847	F2
3848	B4
3849	G2
3850	G3
3851	H3
3852	G3
3853	G3
3854	B1
3855	B1
3856	C3
3857	E5
3858	A4
3859	A4
3860	A4
3861	A4
3862	D4
3863	B3
3864	C1
3865	B2
3866	C2
3867	C4
3868	B5
3869	B2
3870	C5
3871	G1
3872	D1
3873	D1
3874	D1
3875	E2
3876	E2
3877	G1
3878	F2
3879	H3
3880	H3
3881	H2
3882	I2
3883	I3
3884	H3
3885	H3
3886	H4
3887	F2
3888	H1
3889	C2
3890	D1
3891	F4
3893	G4
3894	D3
3895	D3
3896	G2
3897	F4
3898	D5
3899	D5
5802	C5
6871	F1
6872	F1
6873	F1
6874	F2
6875	F1
7800	C2
7801	G4
7806	G3
7807	H3
7808	E2
7812	F2
7851	B2
7871	I3
7873	G1
7874	E1
7875	C5
9800	C4
9802	D2
9803	C5
9804	B2
9805	A4
9806	B2
9808	A4
9809	A4
9810	A4
9811	A4
9812	A2
9821	H3
9822	H2
9823	C3
9825	E3
9826	G1
9829	B4
9831	F1
9832	F2
9833	F3
9834	F3
9835	G4
9837	E2
9839	B4
9840	D1
9841	B2
9842	B2
9843	B2
9844	B1
9845	B1
9846	C1
9847	D1
9848	D1
9849	B3
9850	F3
9852	A2
9853	E1
9854	D1
9855	B3
9856	D4
9857	B4
9858	F4
9859	B4
9860	D4
9861	B3
9862	B5
9863	D5
9864	G2
9865	A1
9866	D5
9867	H1
9868	A5
9869	E5
9870	B5
9871	B5
9874	B4
9875	B4
9876	B5
9881	E1
9882	C4
9883	E1
9884	E1
9887	D1
9888	E5
9889	G4
9890	D5

Component side view

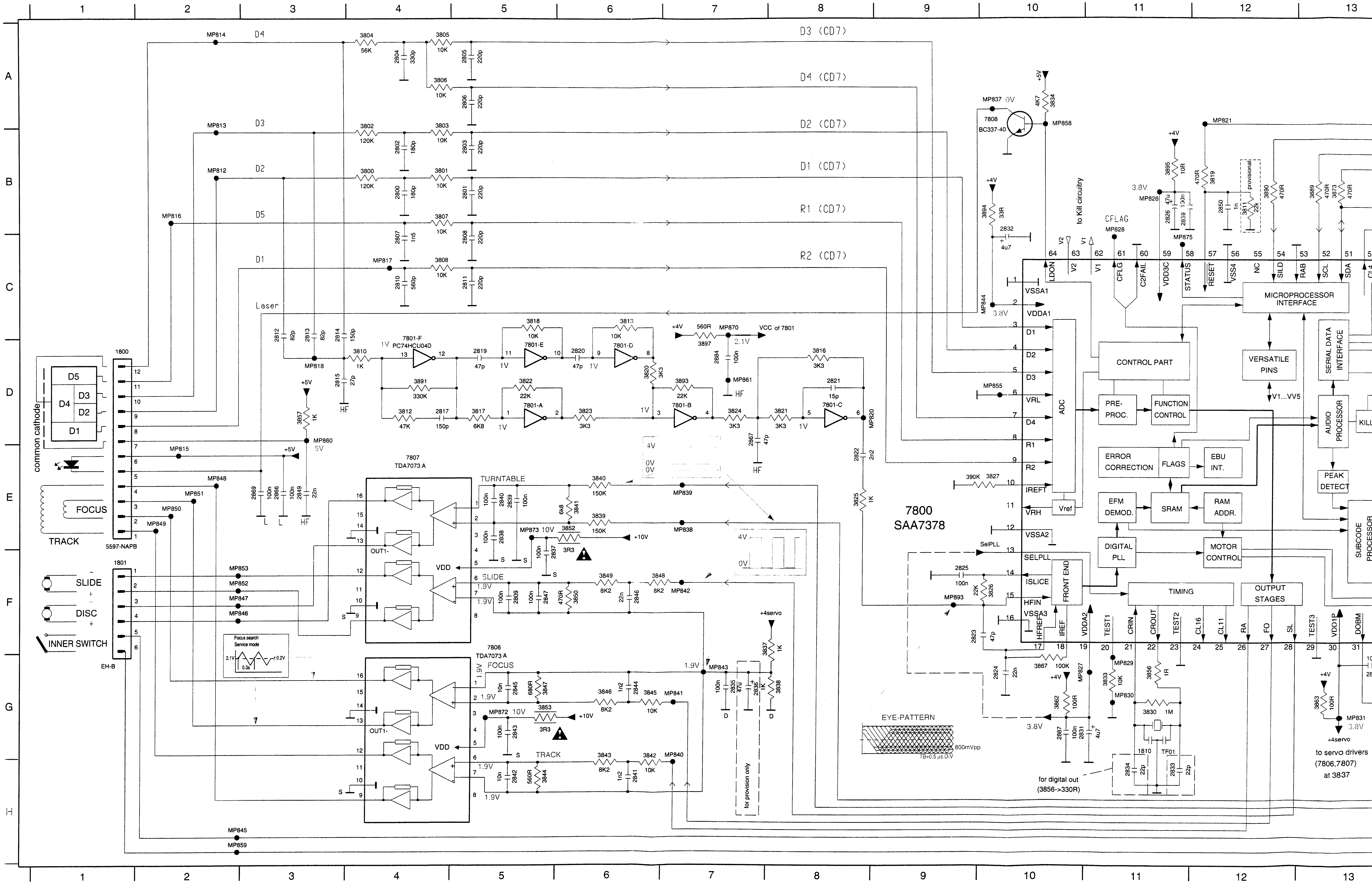

1
2
3
A
B
C
D
E
F
G
H
1805
1810
1800
1801
1878
7806
7807
7871
5802
7875

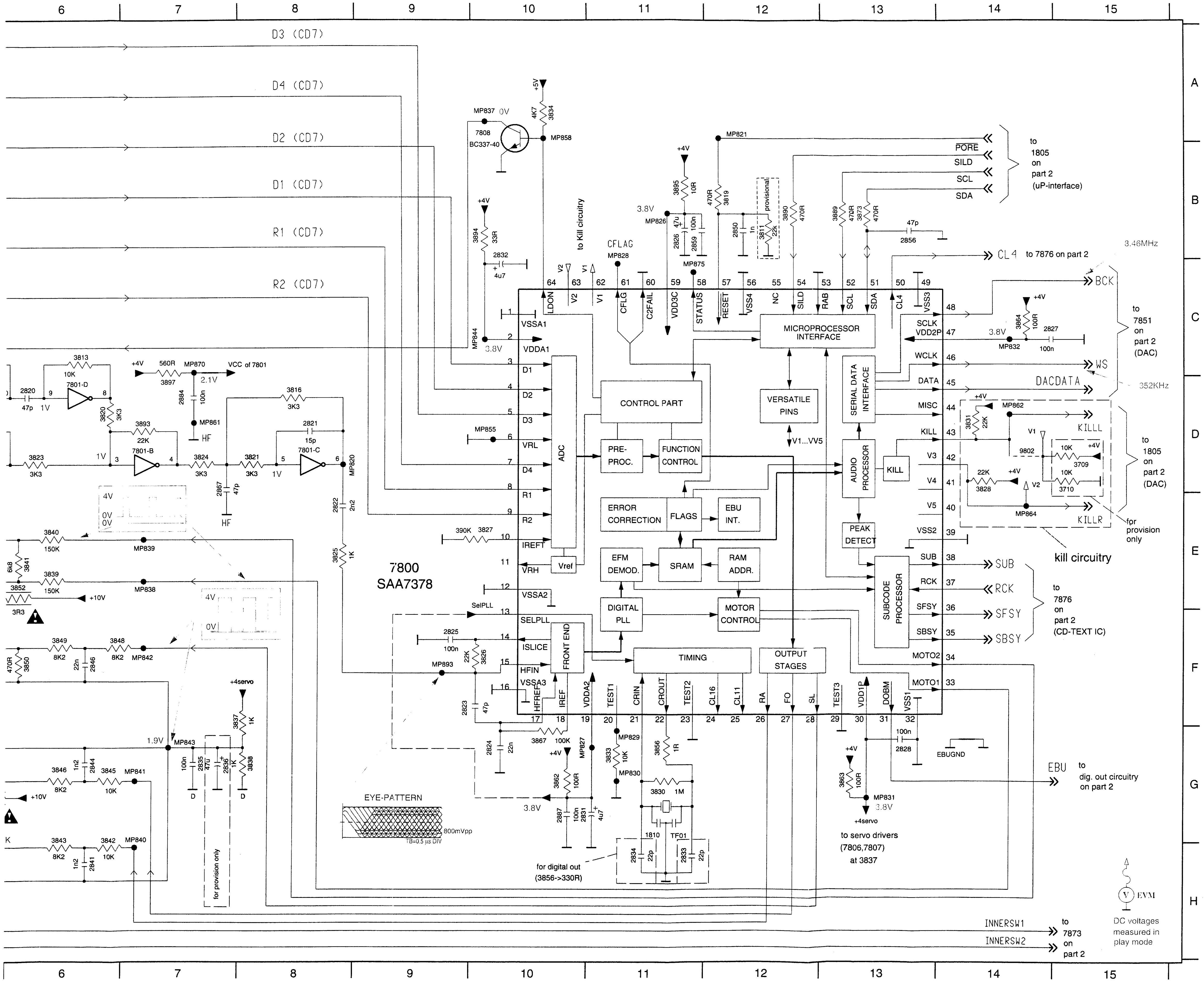
1800	E3	2869	E2	3841	G2	7874	E1
1801	H2	2870	I2	3842	B3	7875	C5
1805	B5	2871	I4	3843	F3	9800	C4
1810	C3	2872	G2	3844	F3	9802	D2
1876	I1	2873	H3	3845	B4	9803	C5
1878	I4	2874	I2	3846	F3	9804	B2
1880	B2	2875	I3	3847	F2	9805	A4
1881	C4	2876	H3	3848	B4	9806	B2
1882	B1	2877	G1	3849	G2	9808	A4
2800	D4	2878	G1	3850	G3	9809	A4
2801	D3	2879	H1	3851	H3	9810	A4
2802	E4	2880	C5	3852	G3	9811	A4
2803	D3	2881	F1	3853	G3	9812	A2
2804	D4	2882	H2	3854	B1	9821	H3
2805	D3	2884	G4	3855	B1	9822	H2
2806	D3	2887	C3	3856	C3	9823	C3
2807	E4	3700	C1	3857	E5	9825	E3
2808	D3	3701	B3	3858	A4	9826	G1
2809	G3	3702	B2	3859	A4	9829	B4
2810	E4	3703	B2	3860	A4	9831	F1
2811	D3	3704	B2	3861	A4	9832	F2
2812	F4	3705	A3	3862	D4	9833	F3
2813	F4	3706	A3	3863	B3	9834	F3
2814	F4	3707	A3	3864	C1	9835	G4
2815	F4	3708	A3	3865	B2	9837	E2
2817	F4	3709	D2	3866	C2	9839	B4
2819	F4	3710	E2	3867	C4	9840	D1
2820	F5	3711	A3	3868	B5	9841	B2
2821	G5	3712	B5	3869	B2	9842	B2
2822	D5	3713	F1	3870	C5	9843	B2
2823	C3	3714	F1	3871	G1	9844	B1
2824	C4	3715	F2	3872	D1	9845	B1
2825	D4	3716	B4	3873	D1	9846	C1
2826	D2	3717	B4	3874	D1	9847	D1
2827	C2	3720	C1	3875	E2	9848	D1
2828	B3	3725	B5	3876	E2	9849	B3
2829	I3	3726	B5	3877	G1	9850	F3
2830	C2	3800	E4	3878	F2	9852	A2
2831	C4	3801	E4	3879	H3	9853	E1
2832	E3	3802	E4	3880	H3	9854	D1
2833	B4	3803	E4	3881	H2	9855	B3
2834	C3	3804	E4	3882	I2	9856	D4
2835	B4	3805	D4	3883	I3	9857	B4
2836	F3	3806	D4	3884	H3	9858	F4
2837	H3	3807	E4	3885	H3	9859	B4
2838	H2	3808	E4	3886	H4	9860	D4
2839	G2	3809	B3	3887	F2	9861	B3
2840	G2	3810	F4	3888	H1	9862	B5
2841	B3	3811	D2	3889	C2	9863	D5
2842	F3	3812	F4	3890	D1	9864	G2
2843	G3	3813	G5	3891	F4	9865	A1
2844	B4	3816	G5	3893	G4	9866	D5
2845	F2	3817	G4	3894	D3	9867	H1
2846	B4	3818	F4	3895	D3	9868	A5
2847	G3	3819	D2	3896	G2	9869	E5
2849	E5	3820	G5	3897	F4	9870	B5
2850	D2	3821	G5	3898	D5	9871	B5
2851	C1	3822	G4	3899	D5	9874	B4
2852	A2	3823	G4	5802	C5	9875	B4
2853	A3	3824	G5	6871	F1	9876	B5
2854	B4	3825	C4	6872	F1	9881	E1
2856	D2	3826	D4	6873	F1	9882	C4
2857	C1	3827	D3	6874	F2	9883	E1
2858	C1	3828	C1	6875	F1	9884	E1
2859	D2	3830	B4	7800	C2	9887	D1
2860	A3	3831	C1	7801	G4	9888	E5
2861	A4	3832	C2	7806	G3	9889	G4
2862	A4	3833	C4	7807	H3	9890	D5
2863	A5	3834	E3	7808	E2		
2864	B3	3837	B3	7812	F2		
2865	C5	3838	B4	7851	B2		
2866	E3	3839	B3	7871	I3		
2867	G5	3840	B3	7873	G1		



1800	D3	2869	E3	3841	F3	9800	C1
1801	G3	2870	H4	3842	B3	9802	D4
1805	A1	2871	H2	3843	F3	9803	C1
1810	B2	2872	F4	3844	F3	9804	B4
1876	H4	2873	G2	3845	B2	9805	A2
1878	H1	2874	H3	3846	F3	9806	B4
1880	B4	2875	H2	3847	E3	9808	A2
1881	C2	2876	G3	3848	B2	9809	A2
1882	B4	2877	G4	3849	F3	9810	A2
2800	D2	2878	G4	3850	F3	9811	A2
2801	D3	2879	G4	3851	G3	9812	A3
2802	D2	2880	C1	3852	G2	9821	G3
2803	D3	2881	E4	3853	F2	9822	G3
2804	D2	2882	G4	3854	B4	9823	C3
2805	D2	2884	F2	3855	B4	9825	E3
2806	D2	2887	C2	3856	B3	9826	G4
2807	E2	3700	C4	3857	E1	9829	B2
2808	D2	3701	B3	3858	A2	9831	F4
2809	F3	3702	B3	3859	A2	9832	E4
2810	E2	3703	B3	3860	A2	9833	E2
2811	D2	3704	B3	3861	A2	9834	E2
2812	E2	3705	A3	3862	C2	9835	F2
2813	E2	3706	A3	3863	B2	9837	E4
2814	E2	3707	A3	3864	C4	9839	B2
2815	E2	3708	A3	3865	B4	9840	D4
2817	F1	3709	D4	3866	B4	9841	B4
2819	F1	3710	E4	3867	C2	9842	B4
2820	F1	3711	A3	3868	B1	9843	B4
2821	G1	3712	B1	3869	B3	9844	B4
2822	C1	3713	E4	3870	C1	9845	B4
2823	C2	3714	E4	3871	G4	9846	C4
2824	C2	3715	E4	3872	D4	9847	D4
2825	C2	3716	B2	3873	C4	9848	D4
2826	D3	3717	B2	3874	D4	9849	B3
2827	C4	3720	C4	3875	D4	9850	E2
2828	B3	3725	B1	3876	D4	9852	A4
2829	H2	3726	B1	3877	G4	9853	E4
2830	C4	3800	E2	3878	E4	9854	D4
2831	C2	3801	D2	3879	G3	9855	B3
2832	D3	3802	E2	3880	H3	9856	D2
2833	B2	3803	D2	3881	H3	9857	B2
2834	B2	3804	E2	3882	H4	9858	F2
2835	B2	3805	D2	3883	H3	9859	B1
2836	E3	3806	D2	3884	H3	9860	D2
2837	G2	3807	E2	3885	H2	9861	B3
2838	G4	3808	E1	3886	G2	9862	A1
2839	F3	3809	B3	3887	F4	9863	D1
2840	F3	3810	E2	3888	G4	9864	G4
2841	B2	3811	D3	3889	C4	9865	A4
2842	F3	3812	E2	3890	D4	9866	C1
2843	F2	3813	F1	3891	E1	9867	G4
2844	B2	3816	F1	3893	F2	9868	A1
2845	F3	3817	F2	3894	D3	9869	D1
2846	B2	3818	F1	3895	D3	9870	B1
2847	F3	3819	D4	3896	F4	9871	B1
2849	E1	3820	F1	3897	F2	9874	B2
2850	D3	3821	G1	3898	C1	9875	B1
2851	C4	3822	F2	3899	C1	9876	B1
2852	A4	3823	F2	5802	C1	9881	D4
2853	A3	3824	G1	6871	F4	9882	C2
2854	B2	3825	C2	6872	F4	9883	D4
2856	C4	3826	C2	6873	F4	9884	E4
2857	C4	3827	C2	6874	F4	9887	C4
2858	C4	3828	C4	6875	F4	9888	D1
2859	C3	3830	B2	7806	F3	9889	F2
2860	A2	3831	C4	7807	G3	9890	D1
2861	A2	3832	C4	7808	E3		
2862	A1	3833	C2	7812	E4		
2863	A1	3834	E3	7851	B4		
2864	B3	3837	B2	7871	H3		
2865	C1	3838	B2	7873	F4		
2866	E3	3839	B3	7874	D4		
2867	F1	3840	B3	7875	C1		

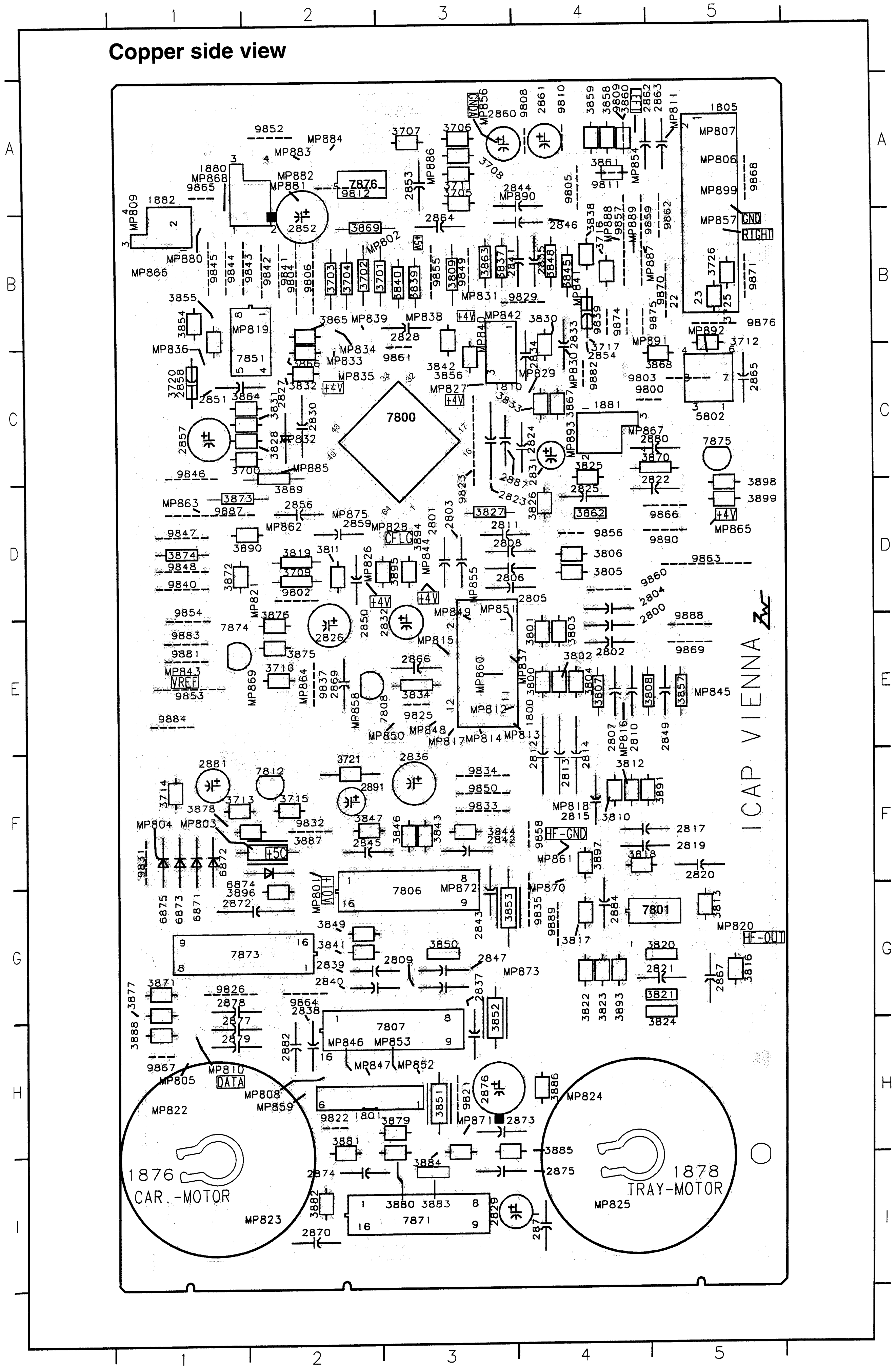
Circuit Diagram Main Board part1


1 2 3 4 5 6 7 8 9 10 11 12 13
A B C D E F G H
MP814 D4
MP813 D3
MP812 D2
MP816 D5
D1
MP817
Laser
3804 56K
3805 10K
3806 10K
3802 120K
3803 10K
3800 120K
3801 10K
3807 10K
3808 10K
2804 330p
2805 220p
2806 220p
2802 180p
2803 220p
2800 180p
2801 220p
2807 1n5
2808 220p
2810 560p
2811 220p
D3 (CD7)
D4 (CD7)
D2 (CD7)
D1 (CD7)
R1 (CD7)
R2 (CD7)
1800
D5
D3
D4
D2
D1
common cathode
FOCUS
TRACK
5597-NAPB
MP815
MP848
MP851
MP850
MP849
+5V
MP860
5V
3857 1K
2812 82p
2813 82p
2814 150p
2815 27p
HF
MP818
3810 1K
1V
7801-F
PC74HCU04D
2819 47p
7801-E
3818 10K
2820 47p
7801-D
3813 10K
3820 3K3
3891 330K
3822 22K
7801-A
3812 47K
2817 150p
3817 6K8
3823 3K3
7801-B
3893 22K
3824 3K3
3821 3K3
7801-C
2821 15p
3816 3K3
+4V
560R 3897
MP870
VCC of 7801
2.1V
2884 100n
MP861
2867 47p
MP820
2822 2n2
3825 1K
4V
0V
0V
1801
SLIDE
DISC
INNER SWITCH
EH-B
MP853
MP852
MP847
MP846
7807
TDA7073 A
TURNTABLE
2869 100n
2866 100n
2849 22n
2840
2839
3840 150K
MP839
3841 6k8
3839 150K
MP838
MP873 10V
3852 3R3
+10V
2838
2837
OUT1-
VDD
SLIDE
1.9V
2809
2847
3850 470R
3849 8K2
2846 22n
3848 8K2
MP842
Focus search
Service mode
2.1V
0.3s
+0.2V
7806
TDA7073 A
FOCUS
2845
3847 680R
3846 8K2
2844 1n2
3845 10K
MP841
MP843
2835 470
2836
3837 1K
3838 1K
+4servo
MP872 10V
3853 3R3
2843
TRACK
2842
3844 560R
3843 8K2
2841 1n2
3842 10K
MP840
for provision only
MP845
MP859
7800
SAA7378
MP837 0V
7808
BC337-40
+5V
3834 4K7
MP858
3894 33R
2832 4u7
MP844
3.8V
to Kill circuitry
MP855
390K 3827
SelPLL
2825 100n
3826 22K
MP893
2823 47p
2824 22n
3867 100K
MP827
3862 100R
2887 100n
2831 4u7
EYE-PATTERN
800mVpp
TB=0.5 µs.DIV
for digital out
(3856->330R)
MP829
3833 10K
MP830
3856 1R
3830 1M
1810
TF01
2834 22p
2833 22p
CFLAG
MP828
3.8V
MP826
3895 10R
2826 47u
2839 100n
MP875
3819 470R
MP821
2850 1n
3811 22K
provisional
3890 470R
3889 470R
3873 470R
3863 100R
MP831
3.8V
+4servo
to servo drivers
(7806,7807)
at 3837
LDON V2 V1 CFLG C2FAIL VDD3C STATUS RESET VSS4 NC SILD RAB SCL SDA
VSSA1 VDDA1 D1 D2 D3 VRL D4 R1 R2 IREFT VRH VSSA2 SELPLL ISLICE HFIN VSSA3
HFREF IREF VDDA2 TEST1 CRIN CROUT TEST2 CL16 CL11 RA FO SL TEST3 VDD1P DOBM
ADC
Vref
FRONT END
CONTROL PART
PRE-PROC.
FUNCTION CONTROL
ERROR CORRECTION
FLAGS
EBU INT.
EFM DEMOD.
SRAM
RAM ADDR.
DIGITAL PLL
MOTOR CONTROL
TIMING
OUTPUT STAGES
MICROPROCESSOR INTERFACE
VERSATILE PINS
V1...VV5
SERIAL DATA INTERFACE
AUDIO PROCESSOR
PEAK DETECT
SUBCODE PROCESSOR
KILL


D3 (CD7)
D4 (CD7)
D2 (CD7)
D1 (CD7)
R1 (CD7)
R2 (CD7)
7800
SAA7378
ADC
CONTROL PART
PRE-PROC.
FUNCTION CONTROL
ERROR CORRECTION
FLAGS
EBU INT.
EFM DEMOD.
SRAM
RAM ADDR.
DIGITAL PLL
MOTOR CONTROL
FRONT END
TIMING
OUTPUT STAGES
MICROPROCESSOR INTERFACE
VERSATILE PINS
SERIAL DATA INTERFACE
AUDIO PROCESSOR
KILL
PEAK DETECT
SUBCODE PROCESSOR
Vref
V1...VV5
to Kill circuitry
7808
BC337-40
MP837 0V
MP858
+5V
to 1805 on part 2 (uP-interface)
PORE
SILD
SCL
SDA
CL4 to 7876 on part 2
BCK
WS
DACDATA
to 7851 on part 2 (DAC)
KILLL
KILLR
to 1805 on part 2 (DAC)
for provision only
kill circuitry
SUB
RCK
SFSY
SBSY
to 7876 on part 2 (CD-TEXT IC)
EBU
to dig. out circuitry on part 2
to servo drivers (7806,7807) at 3837
for digital out (3856->330R)
EYE-PATTERN
800mVpp
TB=0.5 µs DIV
for provision only
VCC of 7801
INNERSW1
INNERSW2
to 7873 on part 2
DC voltages measured in play mode
EVM
3.46MHz
352KHz
EBUGND

1800	D1
1801	F1
1810	G11
2800	B4
2801	B5
2802	B4
2803	B5
2804	A4
2805	A5
2806	A5
2807	C4
2808	C5
2809	F5
2810	C4
2811	C5
2812	C3
2813	C3
2814	C3
2815	D3
2817	D4
2819	D5
2820	D6
2821	D8
2822	E8
2823	F9
2824	G9
2825	F9
2826	B11
2827	C14
2828	G13
2831	G10
2832	B10
2833	H11
2834	H11
2835	G7
2836	G7
2837	F5
2838	E5
2839	E5
2840	E5
2841	H6
2842	H5
2843	G5
2844	G6
2845	G5
2846	F6
2847	F5
2849	E3
2850	B12
2856	B13
2859	B11
2866	E3
2867	D7
2869	E3
2884	D7
2887	G10
3709	D15
3710	D15
3800	B4
3801	B4
3802	A4
3803	A4
3804	A4
3805	A4
3806	A4
3807	B4
3808	C4
3810	D4
3811	B12
3812	D4
3813	C6
3816	D8
3817	D5
3818	C5
3819	B12
3820	D6
3821	D8
3822	D5
3823	D6
3824	D7
3825	E8
3826	F10
3827	E10
3828	D14
3830	G11
3831	D14
3833	G11
3834	B10
3837	F8
3838	G8
3839	E6
3840	E6
3841	E6
3842	G6
3843	G6
3844	H5
3845	G6
3846	G6
3847	G5
3848	F6
3849	F6
3850	F6
3852	E6
3853	G5
3856	G11
3857	D3
3862	G10
3863	G13
3864	C14
3867	G10
3873	B13
3889	B13
3890	B12
3891	D4
3893	D7
3894	B10
3895	B11
3897	D7
7800	E9
7801-A	D5
7801-B	D7
7801-C	D8
7801-D	D6
7801-E	D5
7801-F	D4
7806	G5
7807	E4
7808	B10
9802	D14
MP812	B2
MP813	A2
MP814	A2
MP815	E2
MP816	B2
MP817	C4
MP818	D3
MP820	D8
MP821	B12
MP826	B11
MP827	G10
MP828	B11
MP829	G11
MP830	G11
MP831	G13
MP832	C14
MP837	B10
MP838	E6
MP839	E6
MP840	G7
MP841	G7
MP842	F7
MP843	G7
MP844	C10
MP845	H3
MP846	F2
MP847	F2
MP848	E2
MP849	E2
MP850	E2
MP851	E2
MP852	F2
MP853	F2
MP855	D10
MP858	B10
MP859	H3
MP860	D3
MP861	D7
MP862	D14
MP864	E14
MP870	C7
MP872	G5
MP873	E5
MP875	C11
MP893	F9

Copper side view



1800	E3
1801	H2
1805	B5
1810	C3
1876	I1
1878	I4
1880	B2
1881	C4
1882	B1
2800	D4
2801	D3
2802	E4
2803	D3
2804	D4
2805	D3
2806	D3
2807	E4
2808	D3
2809	G3
2810	E4
2811	D3
2812	F4
2813	F4
2814	F4
2815	F4
2817	F4
2819	F4
2820	F5
2821	G5
2822	D5
2823	C3
2824	C4
2825	D4
2826	D2
2827	C2
2828	B3
2829	I3
2830	C2
2831	C4
2832	E3
2833	B4
2834	C3
2835	B4
2836	F3
2837	H3
2838	H2
2839	G2
2840	G2
2841	B3
2842	F3
2843	G3
2844	B4
2845	F2
2846	B4
2847	G3
2849	E5
2850	D2
2851	C1
2852	A2
2853	A3
2854	B4
2856	D2
2857	C1
2858	C1
2859	D2
2860	A3
2861	A4
2862	A4
2863	A5
2864	B3
2865	C5
2866	E3
2867	G5
2869	E2
2870	I2
2871	I4
2872	G2
2873	H3
2874	I2
2875	I3
2876	H3
2877	G1
2878	G1
2879	H1
2880	C5
2881	F1
2882	H2
2884	G4
2887	C3
3700	C1
3701	B3
3702	B2
3703	B2
3704	B2
3705	A3
3706	A3
3707	A3
3708	A3
3709	D2
3710	E2
3711	A3
3712	B5
3713	F1
3714	F1
3715	F2
3716	B4
3717	B4
3720	C1
3725	B5
3726	B5
3800	E4
3801	E4
3802	E4
3803	E4
3804	E4
3805	D4
3806	D4
3807	E4
3808	E4
3809	B3
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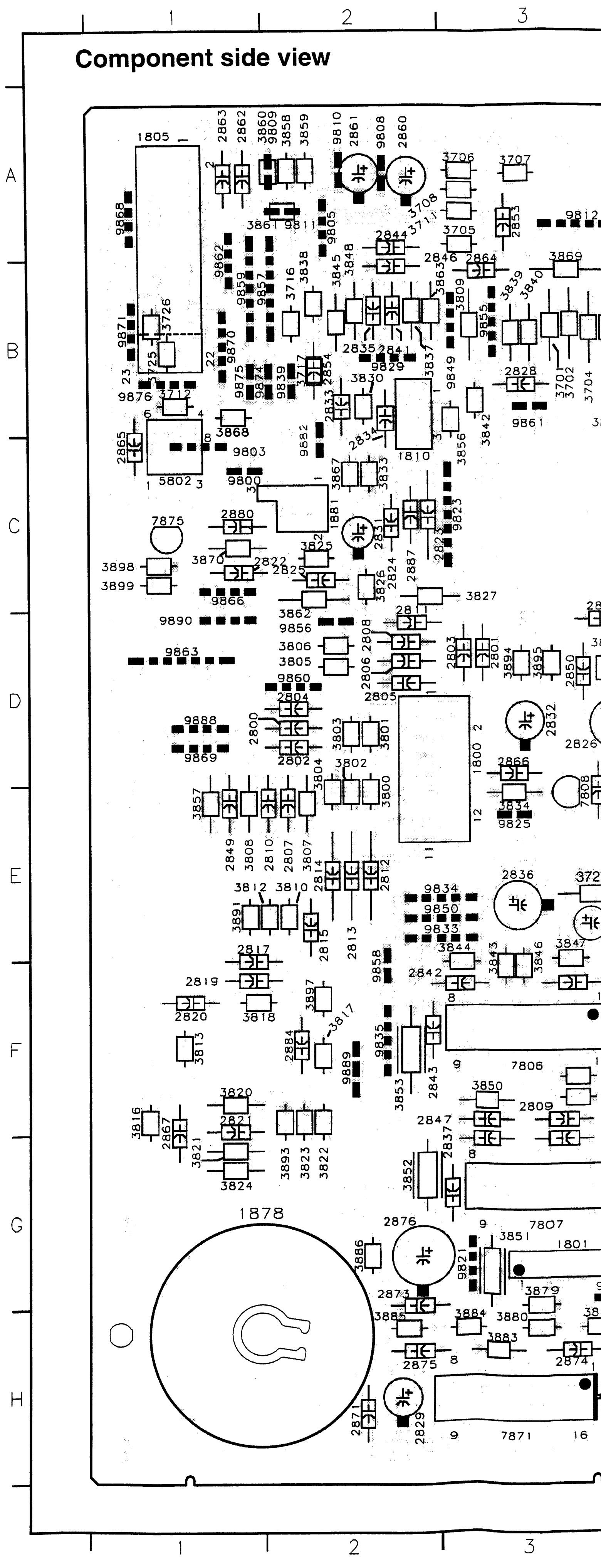
3813	G5
3816	G5
3817	G4
3818	F4
3819	D2
3820	G5
3821	G5
3822	G4
3823	G4
3824	G5
3825	C4
3826	D4
3827	D3
3828	C1
3830	B4
3831	C1
3832	C2
3833	C4
3834	E3
3837	B3
3838	B4
3839	B3
3840	B3
3841	G2
3842	B3
3843	F3
3844	F3
3845	B4
3846	F3
3847	F2
3848	B4
3849	G2
3850	G3
3851	H3
3852	G3
3853	G3
3854	B1
3855	B1
3856	C3
3857	E5
3858	A4
3859	A4
3860	A4
3861	A4
3862	D4
3863	B3
3864	C1
3865	B2
3866	C2
3867	C4
3868	B5
3869	B2
3870	C5
3871	G1
3872	D1
3873	D1
3874	D1
3875	E2
3876	E2
3877	G1
3878	F2
3879	H3
3880	H3
3881	H2
3882	I2
3883	I3
3884	H3
3885	H3
3886	H4
3887	F2
3888	H1
3889	C2
3890	D1
3891	F4
3893	G4
3894	D3
3895	D3
3896	G2
3897	F4
3898	D5
3899	D5
5802	C5
6871	F1
6872	F1
6873	F1
6874	F2
6875	F1
7800	C2
7801	G4
7806	G3
7807	H3
7808	E2
7812	F2
7851	B2
7871	I3
7873	G1
7874	E1
7875	C5
9800	C4
9802	D2
9803	C5
9804	B2
9805	A4
9806	B2
9808	A4
9809	A4
9810	A4
9811	A4
9812	A2
9821	H3
9822	H2
9823	C3
9825	E3
9826	G1
9829	B4
9831	F1
9832	F2
9833	F3
9834	F3
9835	G4
9837	E2
9839	B4
9840	D1
9841	B2
9842	B2
9843	B2
9844	B1
9845	B1
9846	C1
9847	D1
9848	D1
9849	B3
9850	F3
9852	A2
9853	E1
9854	D1
9855	B3
9856	D4
9857	B4
9858	F4
9859	B4
9860	D4
9861	B3
9862	B5
9863	D5
9864	G2
9865	A1
9866	D5
9867	H1
9868	A5
9869	E5
9870	B5
9871	B5
9874	B4
9875	B4
9876	B5
9881	E1
9882	C4
9883	E1
9884	E1
9887	D1
9888	E5
9889	G4
9890	D5

Component side view



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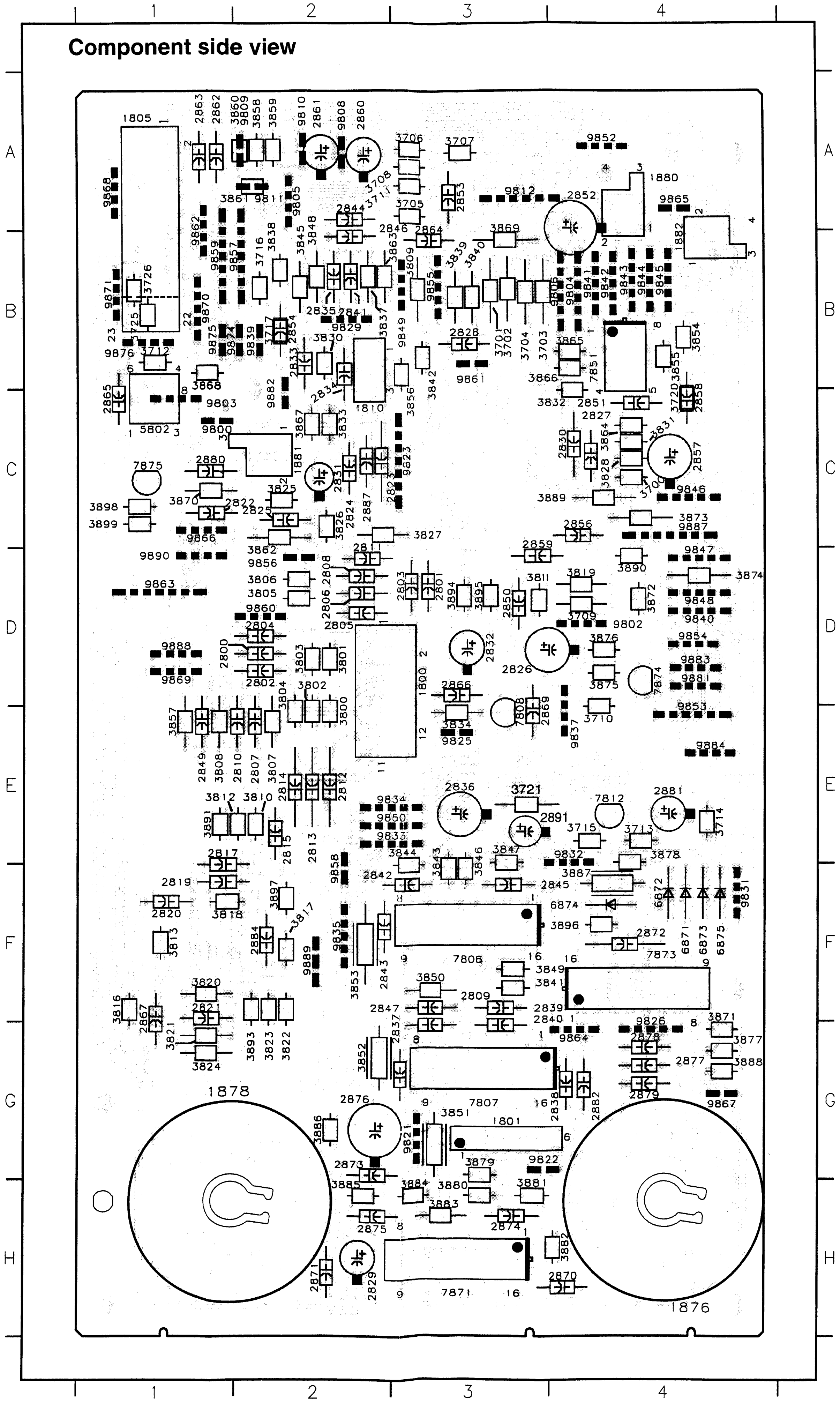
1801	H2	2870	I2	3842	B3	7875	C5
1805	B5	2871	I4	3843	F3	9800	C4
1810	C3	2872	G2	3844	F3	9802	D2
1876	I1	2873	H3	3845	B4	9803	C5
1878	I4	2874	I2	3846	F3	9804	B2
1880	B2	2875	I3	3847	F2	9805	A4
1881	C4	2876	H3	3848	B4	9806	B2
1882	B1	2877	G1	3849	G2	9808	A4
2800	D4	2878	G1	3850	G3	9809	A4
2801	D3	2879	H1	3851	H3	9810	A4
2802	E4	2880	C5	3852	G3	9811	A4
2803	D3	2881	F1	3853	G3	9812	A2
2804	D4	2882	H2	3854	B1	9821	H3
2805	D3	2884	G4	3855	B1	9822	H2
2806	D3	2887	C3	3856	C3	9823	C3
2807	E4	3700	C1	3857	E5	9825	E3
2808	D3	3701	B3	3858	A4	9826	G1
2809	G3	3702	B2	3859	A4	9829	B4
2810	E4	3703	B2	3860	A4	9831	F1
2811	D3	3704	B2	3861	A4	9832	F2
2812	F4	3705	A3	3862	D4	9833	F3
2813	F4	3706	A3	3863	B3	9834	F3
2814	F4	3707	A3	3864	C1	9835	G4
2815	F4	3708	A3	3865	B2	9837	E2
2817	F4	3709	D2	3866	C2	9839	B4
2819	F4	3710	E2	3867	C4	9840	D1
2820	F5	3711	A3	3868	B5	9841	B2
2821	G5	3712	B5	3869	B2	9842	B2
2822	D5	3713	F1	3870	C5	9843	B2
2823	C3	3714	F1	3871	G1	9844	B1
2824	C4	3715	F2	3872	D1	9845	B1
2825	D4	3716	B4	3873	D1	9846	C1
2826	D2	3717	B4	3874	D1	9847	D1
2827	C2	3720	C1	3875	E2	9848	D1
2828	B3	3725	B5	3876	E2	9849	B3
2829	I3	3726	B5	3877	G1	9850	F3
2830	C2	3800	E4	3878	F2	9852	A2
2831	C4	3801	E4	3879	H3	9853	E1
2832	E3	3802	E4	3880	H3	9854	D1
2833	B4	3803	E4	3881	H2	9855	B3
2834	C3	3804	E4	3882	I2	9856	D4
2835	B4	3805	D4	3883	I3	9857	B4
2836	F3	3806	D4	3884	H3	9858	F4
2837	H3	3807	E4	3885	H3	9859	B4
2838	H2	3808	E4	3886	H4	9860	D4
2839	G2	3809	B3	3887	F2	9861	B3
2840	G2	3810	F4	3888	H1	9862	B5
2841	B3	3811	D2	3889	C2	9863	D5
2842	F3	3812	F4	3890	D1	9864	G2
2843	G3	3813	G5	3891	F4	9865	A1
2844	B4	3816	G5	3893	G4	9866	D5
2845	F2	3817	G4	3894	D3	9867	H1
2846	B4	3818	F4	3895	D3	9868	A5
2847	G3	3819	D2	3896	G2	9869	E5
2849	E5	3820	G5	3897	F4	9870	B5
2850	D2	3821	G5	3898	D5	9871	B5
2851	C1	3822	G4	3899	D5	9874	B4
2852	A2	3823	G4	5802	C5	9875	B4
2853	A3	3824	G5	6871	F1	9876	B5
2854	B4	3825	C4	6872	F1	9881	E1
2856	D2	3826	D4	6873	F1	9882	C4
2857	C1	3827	D3	6874	F2	9883	E1
2858	C1	3828	C1	6875	F1	9884	E1
2859	D2	3830	B4	7800	C2	9887	D1
2860	A3	3831	C1	7801	G4	9888	E5
2861	A4	3832	C2	7806	G3	9889	G4
2862	A4	3833	C4	7807	H3	9890	D5
2863	A5	3834	E3	7808	E2		
2864	B3	3837	B3	7812	F2		
2865	C5	3838	B4	7851	B2		
2866	E3	3839	B3	7871	I3		
2867	G5	3840	B3	7873	G1		


Component side view

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1801	G3	2870	H4	3842	B3	9802	D4
1805	A1	2871	H2	3843	F3	9803	C1
1810	B2	2872	F4	3844	F3	9804	B4
1876	H4	2873	G2	3845	B2	9805	A2
1878	H1	2874	H3	3846	F3	9806	B4
1880	B4	2875	H2	3847	E3	9808	A2
1881	C2	2876	G3	3848	B2	9809	A2
1882	B4	2877	G4	3849	F3	9810	A2
2800	D2	2878	G4	3850	F3	9811	A2
2801	D3	2879	G4	3851	G3	9812	A3
2802	D2	2880	C1	3852	G2	9821	G3
2803	D3	2881	E4	3853	F2	9822	G3
2804	D2	2882	G4	3854	B4	9823	C3
2805	D2	2884	F2	3855	B4	9825	E3
2806	D2	2887	C2	3856	B3	9826	G4
2807	E2	3700	C4	3857	E1	9829	B2
2808	D2	3701	B3	3858	A2	9831	F4
2809	F3	3702	B3	3859	A2	9832	E4
2810	E2	3703	B3	3860	A2	9833	E2
2811	D2	3704	B3	3861	A2	9834	E2
2812	E2	3705	A3	3862	C2	9835	F2
2813	E2	3706	A3	3863	B2	9837	E4
2814	E2	3707	A3	3864	C4	9839	B2
2815	E2	3708	A3	3865	B4	9840	D4
2817	F1	3709	D4	3866	B4	9841	B4
2819	F1	3710	E4	3867	C2	9842	B4
2820	F1	3711	A3	3868	B1	9843	B4
2821	G1	3712	B1	3869	B3	9844	B4
2822	C1	3713	E4	3870	C1	9845	B4
2823	C2	3714	E4	3871	G4	9846	C4
2824	C2	3715	E4	3872	D4	9847	D4
2825	C2	3716	B2	3873	C4	9848	D4
2826	D3	3717	B2	3874	D4	9849	B3
2827	C4	3720	C4	3875	D4	9850	E2
2828	B3	3725	B1	3876	D4	9852	A4
2829	H2	3726	B1	3877	G4	9853	E4
2830	C4	3800	E2	3878	E4	9854	D4
2831	C2	3801	D2	3879	G3	9855	B3
2832	D3	3802	E2	3880	H3	9856	D2
2833	B2	3803	D2	3881	H3	9857	B2
2834	B2	3804	E2	3882	H4	9858	F2
2835	B2	3805	D2	3883	H3	9859	B1
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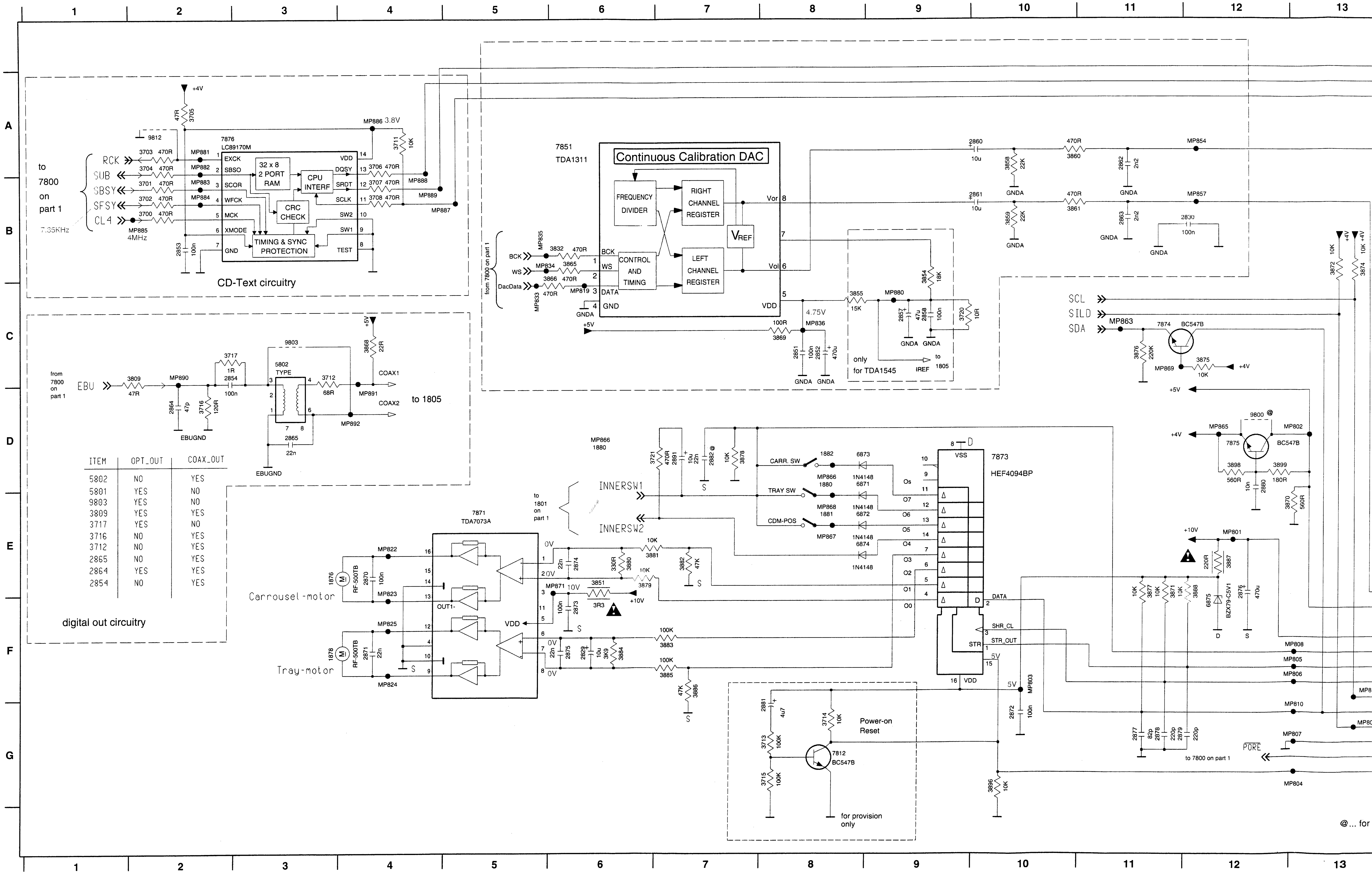
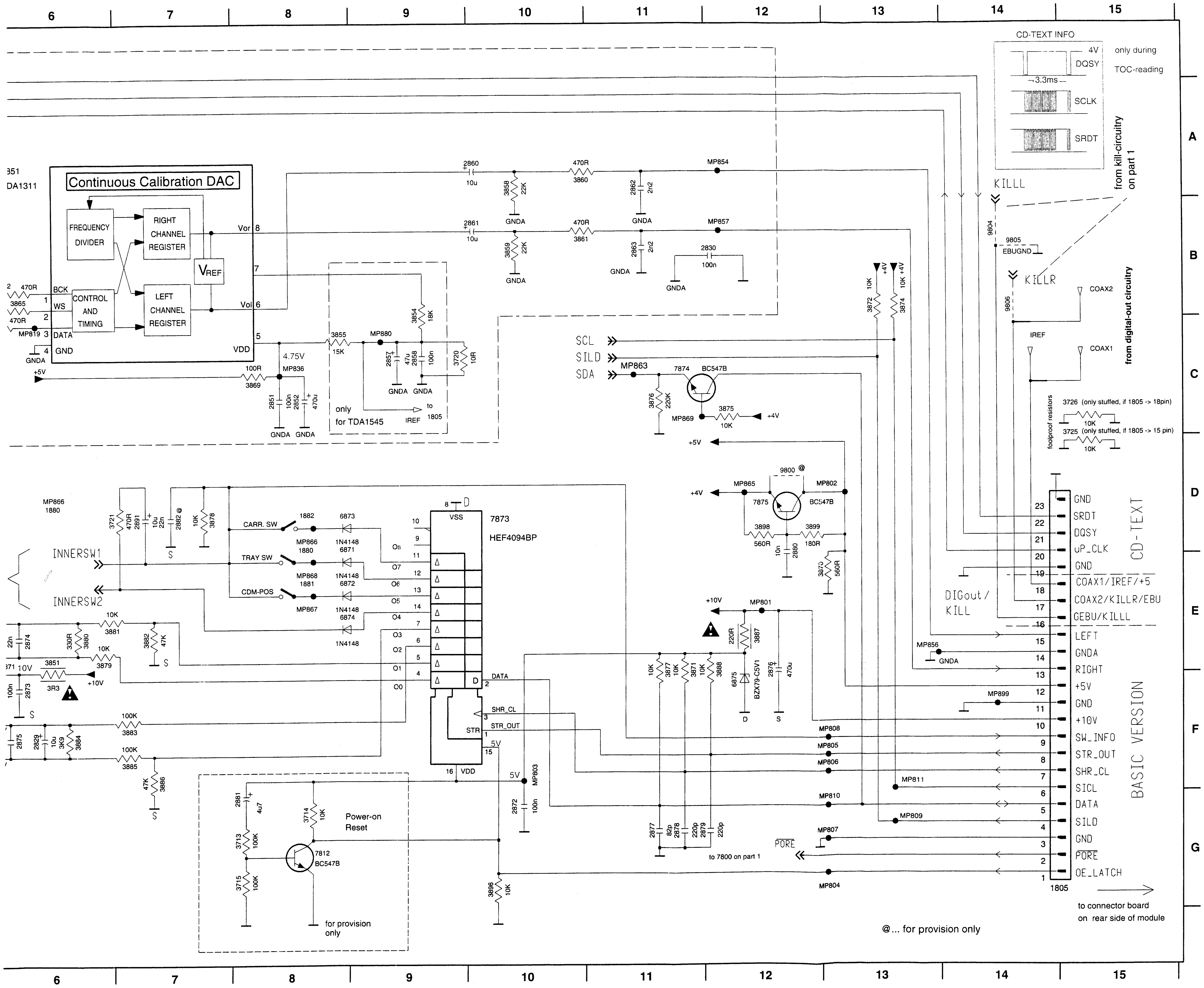
2837	G2	3807	E2	3885	H2	9861	B3
2838	G4	3808	E1	3886	G2	9862	A1
2839	F3	3809	B3	3887	F4	9863	D1
2840	F3	3810	E2	3888	G4	9864	G4
2841	B2	3811	D3	3889	C4	9865	A4
2842	F3	3812	E2	3890	D4	9866	C1
2843	F2	3813	F1	3891	E1	9867	G4
2844	B2	3816	F1	3893	F2	9868	A1
2845	F3	3817	F2	3894	D3	9869	D1
2846	B2	3818	F1	3895	D3	9870	B1
2847	F3	3819	D4	3896	F4	9871	B1
2849	E1	3820	F1	3897	F2	9874	B2
2850	D3	3821	G1	3898	C1	9875	B1
2851	C4	3822	F2	3899	C1	9876	B1
2852	A4	3823	F2	5802	C1	9881	D4
2853	A3	3824	G1	6871	F4	9882	C2
2854	B2	3825	C2	6872	F4	9883	D4
2856	C4	3826	C2	6873	F4	9884	E4
2857	C4	3827	C2	6874	F4	9887	C4
2858	C4	3828	C4	6875	F4	9888	D1
2859	C3	3830	B2	7806	F3	9889	F2
2860	A2	3831	C4	7807	G3	9890	D1
2861	A2	3832	C4	7808	E3		
2862	A1	3833	C2	7812	E4		
2863	A1	3834	E3	7851	B4		
2864	B3	3837	B2	7871	H3		
2865	C1	3838	B2	7873	F4		
2866	E3	3839	B3	7874	D4		
2867	F1	3840	B3	7875	C1		

Circuit Diagram Main Board part2


1 2 3 4 5 6 7 8 9 10 11 12 13
A B C D E F G
+4V
47R 3705
9812
7876
LC89170M
MP886 3.8V
3711 10K
to 7800 on part 1
RCK
SUB
SBSY
SFSY
CL4
7.35KHz
3703 470R
3704 470R
3701 470R
3702 470R
3700 470R
MP881
MP882
MP883
MP884
MP885
4MHz
EXCK
SBSO
SCOR
WFCK
MCK
XMODE
GND
VDD
DQSY
SRDT
SCLK
SW2
SW1
TEST
32 x 8
2 PORT
RAM
CPU
INTERF
CRC
CHECK
TIMING & SYNC
PROTECTION
3706 470R
3707 470R
3708 470R
MP888
MP889
MP887
2853 100n
CD-Text circuitry
7851
TDA1311
Continuous Calibration DAC
FREQUENCY
DIVIDER
RIGHT
CHANNEL
REGISTER
LEFT
CHANNEL
REGISTER
CONTROL
AND
TIMING
VREF
from 7800 on part 1
BCK
WS
DacData
MP835
MP834
MP833
MP819
3832 470R
3865 470R
3866 470R
GNDA
Vor 8
Vol 6
VDD
4.75V
MP836
100R
3869
+5V
2851 100n
2852 470u
3855 15K
MP880
3854 18K
2857 47u
2858 100n
3720 10R
only
for TDA1545
IREF
to 1805
2860 10u
2861 10u
3858 22K
3859 22K
470R 3860
470R 3861
2862 2n2
2863 2n2
MP854
MP857
2830 100n
SCL
SILD
SDA
MP863
7874 BC547B
3876 220K
MP869
3875 10K
3872 10K
3874 10K
from 7800 on part 1
EBU
3809 47R
MP890
2864 47p
3716 120R
EBUGND
3717 1R
2854 100n
9803
5802 TYPE
3712 68R
MP891
COAX1
COAX2
MP892
to 1805
2865 22n
3868 22R
+5V
digital out circuitry
MP866
1880
3721 470R
2891 10u
22n
2882 @
3878 10K
to 1801 on part 1
INNERSW1
INNERSW2
CARR. SW
TRAY SW
CDM-POS
1882
MP866 1880
MP868 1881
MP867
6873 1N4148
6871 1N4148
6872 1N4148
6874 1N4148
7873
HEF4094BP
VSS
DATA
SHR_CL
STR_OUT
STR
VDD
Os
O7
O6
O5
O4
O3
O2
O1
O0
7871
TDA7073A
MP822
MP823
MP825
MP824
1876
1878
RF-500TB
2870 100n
2871 22n
Carrousel-motor
Tray-motor
OUT1-
VDD
0V
20V
MP871 10V
3881 10K
3880 330R
3879 10K
3882 47K
3851 3R3
+10V
2873 100n
2874 22n
2875 22n
2829 10u
3884 3K9
3883 100K
3885 100K
3886 47K
2881 4u7
3713 100K
3714 10K
3715 100K
7812 BC547B
Power-on
Reset
for provision
only
3896 10K
5V
MP803
2872 100n
9800 @
MP865
MP802
7875 BC547B
+4V
3898 560R
3899 180R
2880 10n
3870 560R
+10V
MP801
220R 3887
6875 BZX79-C5V1
2876 470u
3877 10K
3871 10K
3888 10K
2877 82p
2878 220p
2879 220p
to 7800 on part 1
PORE
MP808
MP805
MP806
MP810
MP807
MP804
@... for

ITEM	OPT_OUT	COAX_OUT
5802	NO	YES
5801	YES	NO
9803	YES	NO
3809	YES	YES
3717	YES	NO
3716	NO	YES
3712	NO	YES
2865	NO	YES
2864	YES	YES
2854	NO	YES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12
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14
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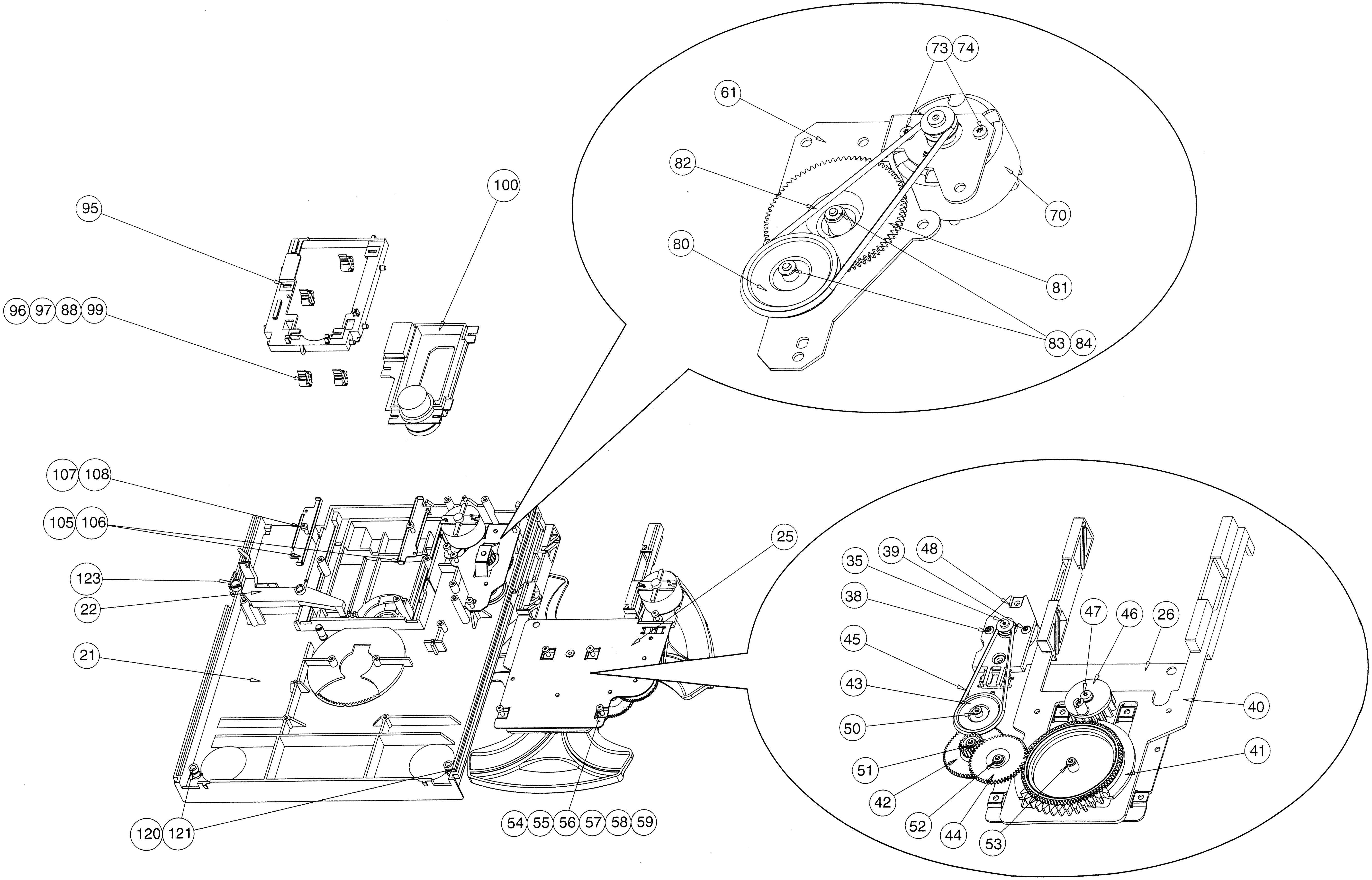
A
B
C
D
E
F
G
Continuous Calibration DAC
TDA1311
FREQUENCY DIVIDER
RIGHT CHANNEL REGISTER
LEFT CHANNEL REGISTER
CONTROL AND TIMING
VREF
BCK
WS
DATA
GND
VDD
Vor 8
Vol 6
3865
470R
MP819
GNDA
+5V
3869
100R
4.75V
MP836
2851
2852
470u
3855
15K
MP880
2857
47u
2858
100n
3854
18K
3720
10R
only for TDA1545
IREF
to 1805
2860
10u
2861
3858
22K
3859
GNDA
470R
3860
3861
2862
2n2
2863
MP854
MP857
2830
100n
SCL
SILD
SDA
MP863
7874
BC547B
3876
220K
MP869
3875
10K
+4V
+5V
3872
3874
10K
CD-TEXT INFO
4V
DQSY
3.3ms
SCLK
SRDT
only during TOC-reading
KILLL
from kill-circuitry on part 1
9804
9805
EBUGND
KILLR
9806
COAX2
COAX1
IREF
from digital-out circuitry
3726 (only stuffed, if 1805 -> 18pin)
3725 (only stuffed, if 1805 -> 15 pin)
foolproof resistors
9800 @
MP865
MP802
7875
BC547B
3898
560R
3899
180R
2880
10n
3870
560R
+10V
MP801
3887
220R
6875
BZX79-C5V1
2876
470u
3877
3871
3888
2877
82p
2878
220p
2879
220p
to 7800 on part 1
MP866
1880
3721
470R
2891
10u
2882 @
22n
3878
10K
CARR. SW
1882
6873
1N4148
TRAY SW
MP868
1881
6871
CDM-POS
MP867
6872
6874
INNERSW1
INNERSW2
3881
3880
330R
3879
3882
47K
3851
3R3
10V
2873
2874
22n
3883
100K
3885
3884
3K9
2875
2829
3886
7873
HEF4094BP
VSS
VDD
DATA
SHR_CL
STR
STR_OUT
5V
MP803
2872
100n
3896
10K
2881
4u7
3714
3713
100K
3715
7812
BC547B
Power-on Reset
for provision only
MP856
MP899
MP808
MP805
MP806
MP811
MP810
MP809
MP807
MP804
PORE
DIGout/ KILL
CD-TEXT
BASIC VERSION
GND
SRDT
DQSY
uP_CLK
COAX1/IREF/+5
COAX2/KILLR/EBU
GEBU/KILLL
LEFT
GNDA
RIGHT
+5V
+10V
SW_INFO
STR_OUT
SHR_CL
SICL
DATA
SILD
PORE
OE_LATCH
1805
to connector board on rear side of module
@... for provision only

1805	G14
1876	E3
1878	F3
1880	D8
1881	E8
1882	D8
2829	F6
2830	B12
2851	C8
2852	C8
2853	B2
2854	C2
2857	C9
2858	C9
2860	A10
2861	B10
2862	A11
2863	B11
2864	D2
2865	D3
2870	E4
2871	F4
2872	G10
2873	F6
2874	E6
2875	F6
2876	E12
2877	G11
2878	G11
2879	G11
2880	D12
2881	G8
2882	D7
3700	B2
3701	B2
3702	B2
3703	A2
3704	A2
3705	A2
3706	A4
3707	B4
3708	B4
3711	A4
3712	C3
3713	G8
3714	G8
3715	G8
3716	D2
3717	C2
3720	C9
3725	D15
3726	C15
3809	C2
3832	B6
3851	E6
3854	B9
3855	C8
3858	A10
3859	B10
3860	A10
3861	B10
3865	B6
3866	C6
3868	C4
3869	C8
3870	E12
3871	E11
3872	B13
3874	B13
3875	C12
3876	C11
3877	E11
3878	D7
3879	E6
3880	E6
3881	E6
3882	E7
3883	F7
3884	F6
3885	F7
3886	F7
3887	E12
3888	E12
3896	G10
3898	D12
3899	D12
5802	C3
6871	D8
6872	E8
6873	D8
6874	E8
6875	F12
7812	G8
7851	A6
7871	E5
7873	D10
7874	C11
7875	D12
7876	A2
9800	D12
9803	C3
9804	B14
9805	B14
9806	B14
9808	A10
9809	A10
9810	B10
9811	B10
9812	A2
MP801	E12
MP802	D13
MP803	F10
MP804	G13
MP805	F13
MP806	F13
MP807	G13
MP808	F13
MP809	G13
MP810	G13
MP811	F13
MP819	C6
MP822	E4
MP823	E4
MP824	F4
MP825	F4
MP833	C5
MP834	B5
MP835	B5
MP836	C8
MP854	A12
MP856	E13
MP857	B12
MP863	C11
MP865	D12
MP866	D8
MP867	E8
MP868	E8
MP869	C11
MP871	E6
MP880	C9
MP881	A2
MP882	A2
MP883	B2
MP884	B2
MP885	B2
MP886	A4
MP887	B4
MP888	B4
MP889	B4
MP890	C2
MP891	D4
MP892	D4
MP899	F14

EXPLODED VIEW (3CDC MODULE)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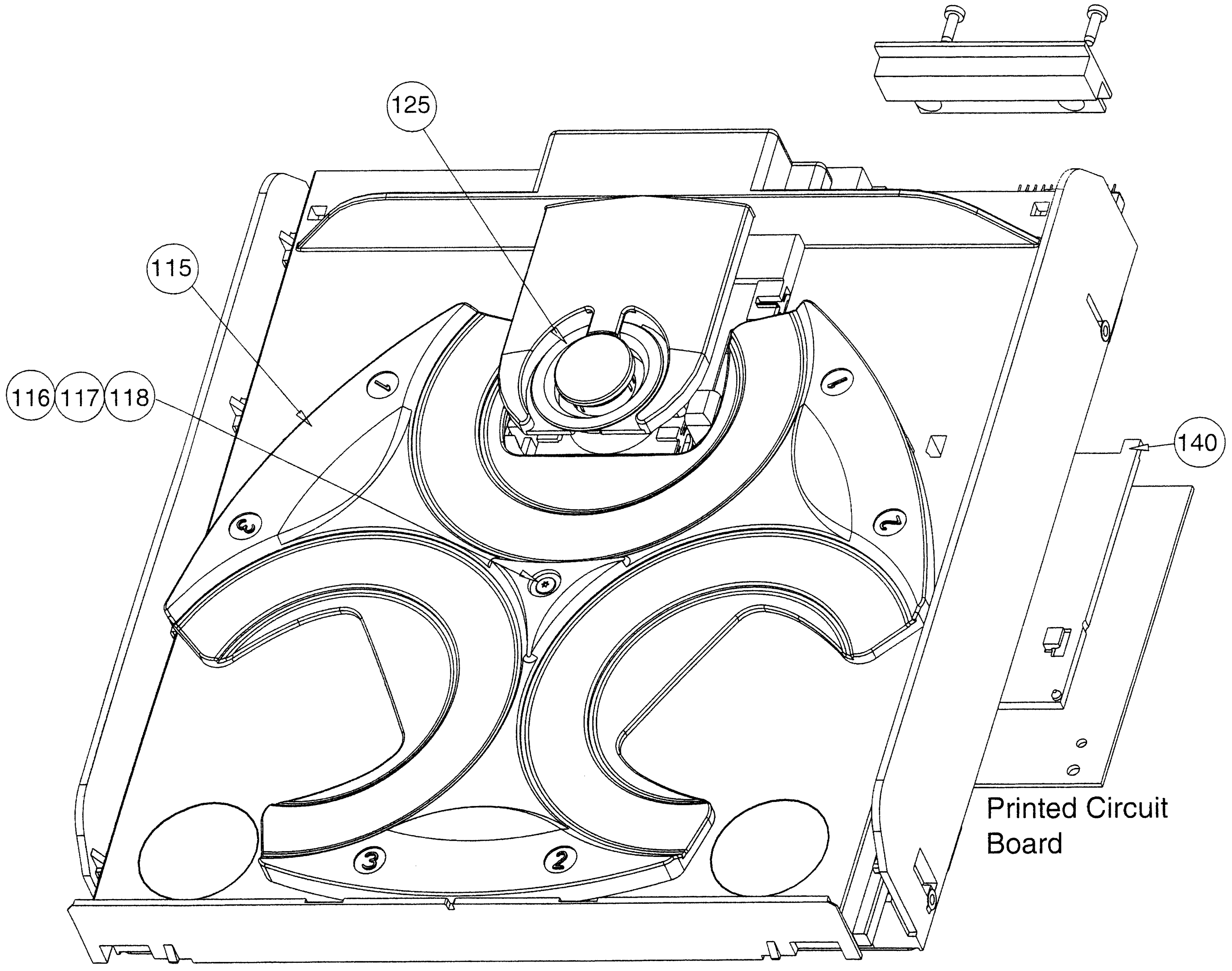
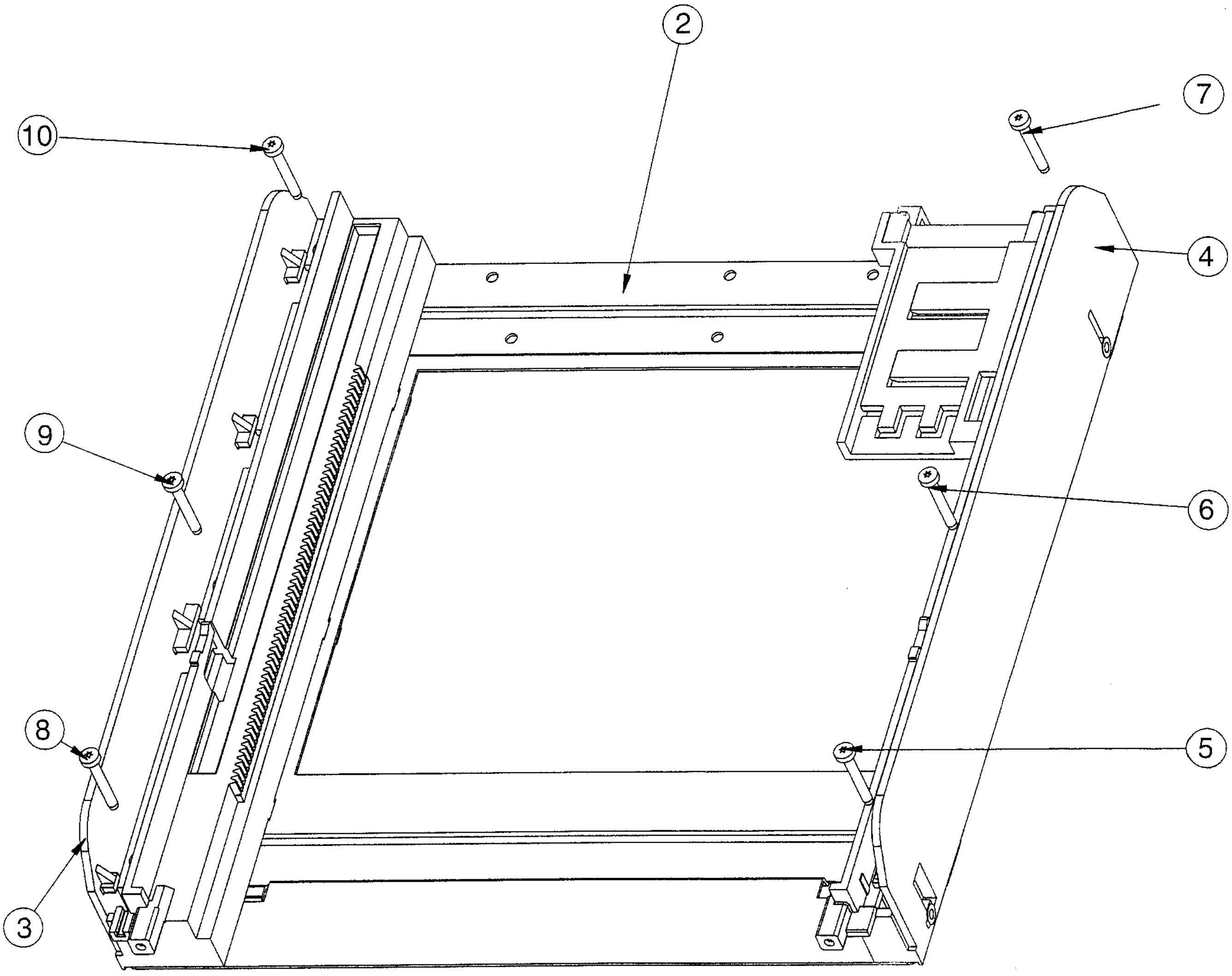


MECHANICAL PARTSLIST 3CDC MODULE

	4822 390 10136	POLYLUB GLY801 (GREASE)
3	4822 463 11008	GUIDE LEFT
4	4822 463 11009	GUIDE RIGHT
21	4822 441 11615	DRAWER
22	4822 402 10088	BRACKET TUMBLER
38	4822 502 12548	SCREW M2,6X3,5
39	4822 502 12548	SCREW M2,6X3,5
40	4822 463 11011	SLIDE
41	4822 522 10509	CONTROL DISC
42	4822 522 10492	GEAR WHEEL
43	4822 528 10937	PULLEY
44	4822 522 10493	IDLER WHEEL
45	4822 358 10115	BELT
46	4822 466 10735	ECCENTRIC GEAR WHEEL
50	4822 532 12364	WASHER
51	4822 532 12364	WASHER
52	4822 532 12364	WASHER
53	4822 532 12364	WASHER
35	4822 361 10753	CARROUSEL MOTOR
70	4822 361 10753	CARROUSEL MOTOR



MECHANICAL PARTSLIST 3CDC MODULE

73	4822 502 12548	SCREW M2,6X3,5
74	4822 502 12548	SCREW M2,6X3,5
80	4822 528 10937	PULLEY
81	4822 522 10494	GEAR DRAWER
82	4822 358 10115	BELT
83	4822 532 12364	WASHER
84	4822 532 12364	WASHER
95	4822 404 10894	SUPPORT
96	4822 325 50215	SUSPENSION
97	4822 325 50215	SUSPENSION
98	4822 325 50215	SUSPENSION
99	4822 325 50215	SUSPENSION
100	4822 691 10615	CD DRIVE VAM1201
115	4822 466 10736	CARROUSEL
117	4822 532 12365	BUSH DRAWER
120	4822 532 51756	GROMMET
121	4822 532 51756	GROMMET
123	4822 402 10085	SWITCH BRACKET
125	4822 401 11708	DISC CLAMP
140	4822 466 10734	PLATE

ELECTRICAL PARTSLIST 3CDC MODULE

MISCELLANEOUS

1800	4822 267 51453	Flex Foil connector 12pin
1805	4822 265 10979	Flex Foil connector 15pin
1805	4822 265 11182	Flex Foil connector 23pin
1805	4822 265 11184	Flex Foil connector 18pin
1806	4822 265 10981	Flex Foil connector 15pin
1806	4822 267 10757	Flex Foil connector 23pin top entry
1806	4822 265 11185	Flex Foil connector 18pin top entry
1860	4822 265 11183	Flex Foil connector 4pin side entry
1880	4822 276 13503	Switch
1881	4822 276 13503	Switch
1882	4822 276 13503	Switch
8002	4822 320 11974	Flex Foil 15pin length= 190mm
8002	4822 320 12229	Flex Foil 18pin length= 190mm
8002	4822 320 12231	Flex Foil 23pin length= 190mm
8002	4822 320 12232	Flex Foil 15pin length= 480mm

CAPACITORS

2800	4822 126 10053	180pF	10%	50V
2801	4822 122 10466	220pF	10%	50V
2802	4822 126 10053	180pF	10%	50V
2803	4822 122 10466	220pF	10%	50V
2804	4822 126 12787	330pF	10%	50V
2805	4822 122 10466	220pF	10%	50V
2806	4822 122 10466	220pF	10%	50V
2807	4822 126 12878	1,5nF	10%	16V
2808	4822 122 10466	220pF	10%	50V
2809	4822 126 12882	100nF	20%	50V
2810	4822 122 10459	560pF	10%	50V
2811	4822 122 10466	220pF	10%	50V
2812	4822 122 10319	82pF	5%	50V
2813	4822 122 10319	82pF	5%	50V
2814	4822 122 33849	150pF	10%	50V
2815	4822 122 33192	27pF	5%	50V
2817	4822 122 33849	150pF	10%	50V
2819	4822 122 33848	47pF	5%	50V
2820	4822 122 33848	47pF	5%	50V
2821	4822 122 10462	15pF	5%	50V
2822	4822 126 12339	2,2nF	10%	16V
2823	4822 122 33848	47pF	5%	50V
2824	4822 126 11585	22nF	20%	50V
2825	4822 126 12882	100nF	20%	50V
2826	4822 124 23624	470µF	20%	16V
2827	4822 126 12882	100nF	20%	50V
2828	4822 126 12882	100nF	20%	50V
2829	4822 124 41579	10µF	20%	50V
2830	4822 126 12882	100nF	20%	50V
2831	4822 124 12032	4,7µF	20%	50V
2832	4822 124 12032	4,7µF	20%	50V
2833	4822 122 33191	22pF	5%	50V
2834	4822 122 33191	22pF	5%	50V
2835	4822 126 12882	100nF	20%	50V
2837	4822 126 12882	100nF	20%	50V
2838	4822 126 12882	100nF	20%	50V
2839	4822 126 12882	100nF	20%	50V
2840	4822 126 12882	100nF	20%	50V
2841	4822 122 10574	1,2nF	10%	16V
2842	4822 121 51387	10nF	20%	16V
2843	4822 126 12882	100nF	20%	50V
2844	4822 122 10574	1,2nF	10%	16V
2845	4822 121 51387	10nF	20%	16V
2846	4822 126 11585	22nF	20%	50V
2847	4822 126 12882	100nF	20%	50V

CAPACITORS

2849	4822 126 11585	22nF	20%	50V
2850	4822 122 33197	1nF	10%	50V
2851	4822 126 12882	100nF	20%	50V
2852	4822 124 80857	470µF	20%	16V
2853	4822 126 12882	100nF	20%	50V
2856	4822 122 33848	47pF	5%	50V
2859	4822 126 12882	100nF	20%	50V
2860	4822 124 41579	10µF	20%	50V
2861	4822 124 41579	10µF	20%	50V
2862	4822 126 12339	2,2nF	10%	16V
2863	4822 126 12339	2,2nF	10%	16V
2864	4822 122 33848	47pF	5%	50V
2866	4822 126 12882	100nF	20%	50V
2867	4822 122 33848	47pF	5%	50V
2868	4822 126 12882	100nF	20%	50V
2869	4822 126 12882	100nF	20%	50V
2870	4822 126 12882	100nF	20%	50V
2871	4822 126 11585	22nF	20%	50V
2872	4822 126 12882	100nF	20%	50V
2873	4822 126 12882	100nF	20%	50V
2874	4822 126 11585	22nF	20%	50V
2875	4822 126 11585	22nF	20%	50V
2876	4822 124 80857	470µF	20%	16V
2877	4822 122 10319	82pF	5%	50V
2878	4822 122 10466	220pF	10%	50V
2879	4822 122 10466	220pF	10%	50V
2880	4822 121 51387	10nF	20%	16V
2884	4822 126 12882	100nF	20%	50V
2887	4822 126 12882	100nF	20%	50V
2890	4822 124 23624	470µF	20%	16V
2891	4822 124 12125	10µF	20%	16V

RESISTORS

3700	4822 116 83883	470Ω	5%	0,16W
3701	4822 116 83883	470Ω	5%	0,16W
3702	4822 116 83883	470Ω	5%	0,16W
3703	4822 116 83883	470Ω	5%	0,16W
3704	4822 116 83883	470Ω	5%	0,16W
3705	4822 116 52195	47Ω	5%	0,5W
3706	4822 116 83883	470Ω	5%	0,16W
3707	4822 116 83883	470Ω	5%	0,16W
3708	4822 116 83883	470Ω	5%	0,16W
3710	4822 116 83864	10kΩ	5%	0,5W
3711	4822 116 83864	10kΩ	5%	0,5W
3717	4822 116 80176	1Ω	5%	0,5W
3720	4822 116 52176	10Ω	5%	0,5W
3721	4822 116 83883	470Ω	5%	0,16W
3725	4822 116 83864	10kΩ	5%	0,5W
3726	4822 116 83864	10kΩ	5%	0,5W
3800	4822 116 52239	120kΩ	5%	0,5W
3801	4822 116 83864	10kΩ	5%	0,5W
3802	4822 116 52239	120kΩ	5%	0,5W
3803	4822 116 83864	10kΩ	5%	0,5W
3804	4822 116 52291	56kΩ	5%	0,5W
3805	4822 116 83864	10kΩ	5%	0,5W
3806	4822 116 83864	10kΩ	5%	0,5W
3807	4822 116 83864	10kΩ	5%	0,5W
3808	4822 116 83864	10kΩ	5%	0,5W
3809	4822 116 52175	100Ω	5%	0,5W
3810	4822 050 11002	1kΩ	5%	0,2W
3812	4822 116 83884	47kΩ	5%	0,16W
3813	4822 116 83864	10kΩ	5%	0,5W
3816	4822 116 52269	3,3kΩ	5%	0,5W

ELECTRICAL PARTSLIST 3CDC MODULE

RESISTORS

3817	4822 116 83961	6,8kΩ	5%	0,16W
3818	4822 116 83864	10kΩ	5%	0,5W
3819	4822 116 83883	470Ω	5%	0,16W
3820	4822 116 52269	3,3kΩ	5%	0,5W
3821	4822 116 52269	3,3kΩ	5%	0,5W
3822	4822 116 52257	22kΩ	5%	0,5W
3823	4822 116 52269	3,3kΩ	5%	0,5W
3824	4822 116 52269	3,3kΩ	5%	0,5W
3825	4822 050 11002	1kΩ	5%	0,2W
3826	4822 116 52257	22kΩ	5%	0,5W
3827	4822 116 52278	390kΩ	5%	0,5W
3828	4822 116 52257	22kΩ	5%	0,5W
3830	4822 116 52235	1MΩ	5%	0,5W
3831	4822 116 52257	22kΩ	5%	0,5W
3832	4822 116 83883	470Ω	5%	0,16W
3833	4822 116 83864	10kΩ	5%	0,5W
3834	4822 116 52283	4,7kΩ	5%	0,5W
3837	4822 050 11002	1kΩ	5%	0,2W
3838	4822 050 11002	1kΩ	5%	0,2W
3839	4822 116 52245	150kΩ	5%	0,16W
3840	4822 116 52245	150kΩ	5%	0,16W
3841	4822 116 83961	6,8kΩ	5%	0,16W
3842	4822 116 83864	10kΩ	5%	0,5W
3843	4822 116 52303	8,2kΩ	5%	0,5W
3844	4822 116 52226	560Ω	5%	0,5W
3844	4822 116 83883	470Ω	5%	0,16W
3845	4822 116 83864	10kΩ	5%	0,5W
3846	4822 116 52303	8,2kΩ	5%	0,5W
3847	4822 116 52228	680Ω	5%	0,5W
3847	4822 116 83883	470Ω	5%	0,16W
3848	4822 116 52303	8,2kΩ	5%	0,5W
3849	4822 116 52303	8,2kΩ	5%	0,5W
3850	4822 116 83883	470Ω	5%	0,16W
3851	4822 052 10338	3,3Ω		NFR25
3852	4822 052 10338	3,3Ω		NFR25
3853	4822 052 10338	3,3Ω		NFR25
3856	4822 116 52219	330Ω	5%	0,5W
3856	4822 116 80176	1Ω	5%	0,5W
3857	4822 050 11002	1kΩ	5%	0,2W
3858	4822 116 52257	22kΩ	5%	0,5W
3859	4822 116 52257	22kΩ	5%	0,5W
3860	4822 116 83883	470Ω	5%	0,16W
3861	4822 116 83883	470Ω	5%	0,16W
3862	4822 116 52175	100Ω	5%	0,5W
3863	4822 116 52175	100Ω	5%	0,5W
3864	4822 116 52175	100Ω	5%	0,5W
3865	4822 116 83883	470Ω	5%	0,16W
3866	4822 116 83883	470Ω	5%	0,16W
3867	4822 116 52234	100kΩ	5%	0,5W
3868	4822 116 52191	33Ω	5%	0,5W
3869	4822 116 52175	100Ω	5%	0,5W
3870	4822 116 52226	560Ω	5%	0,5W
3871	4822 116 83864	10kΩ	5%	0,5W
3872	4822 116 83864	10kΩ	5%	0,5W
3873	4822 116 83883	470Ω	5%	0,16W
3874	4822 116 83864	10kΩ	5%	0,5W
3875	4822 116 83864	10kΩ	5%	0,5W
3876	4822 116 83874	220kΩ	5%	0,5W
3877	4822 116 83864	10kΩ	5%	0,5W
3878	4822 116 83864	10kΩ	5%	0,5W

RESISTORS

3879	4822 116 83864	10kΩ	5%	0,5W
3880	4822 116 52219	330Ω	5%	0,5W
3881	4822 116 83864	10kΩ	5%	0,5W
3882	4822 116 83884	47kΩ	5%	0,16W
3883	4822 116 52234	100kΩ	5%	0,5W
3884	4822 116 52276	3,9kΩ	5%	0,5W
3885	4822 116 52234	100kΩ	5%	0,5W
3886	4822 116 83884	47kΩ	5%	0,16W
3887	4822 052 10221	220Ω	5%	
3888	4822 116 83864	10kΩ	5%	0,5W
3889	4822 116 83883	470Ω	5%	0,16W
3890	4822 116 83883	470Ω	5%	0,16W
3891	4822 116 52272	330kΩ	5%	0,5W
3893	4822 116 52257	22kΩ	5%	0,5W
3894	4822 116 52191	33Ω	5%	0,5W
3895	4822 116 52176	10Ω	5%	0,5W
3896	4822 116 83864	10kΩ	5%	0,5W
3897	4822 116 52226	560Ω	5%	0,5W
3898	4822 116 52226	560Ω	5%	0,5W
3899	4822 116 52213	180Ω	5%	0,5W

COILS

1810	4822 242 10849	CRYSTAL 8MHz
1810	4822 242 73557	CERAMIC RES. 8,46MHz
5801	4822 157 71249	4,7µH

DIODES

6871	4822 130 30621	1N4148
6872	4822 130 30621	1N4148
6873	4822 130 30621	1N4148
6874	4822 130 30621	1N4148
6875	4822 130 34233	BZX79-B5V1

TRANSISTORS

7808	4822 130 41344	BC337-40
7874	4822 130 40959	BC547B
7875	4822 130 40959	BC547B

INTEGRATED CIRCUITS

7800©	4822 209 12752	SAA7378GP (Signal Processor CD7)
7801©	5322 209 11517	PC74HCU04T (HF Amplifier)
7806	4822 209 32852	TDA7073A/N2 (Servo Driver)
7807	4822 209 32852	TDA7073A/N2 (Motor Driver)
7810	4822 130 10845	OPTICAL OUT UNIT
7851	4822 209 32421	TDA1311A/N2(DAC)
7871	4822 209 32852	TDA7073A/N2 (Motor Driver)
7873	5322 209 10421	HEF4094BP (Shift Register)
7876	4822 209 16143	LC89170M (CD Text)

POWER 5 MODULE

(4-Channel version)

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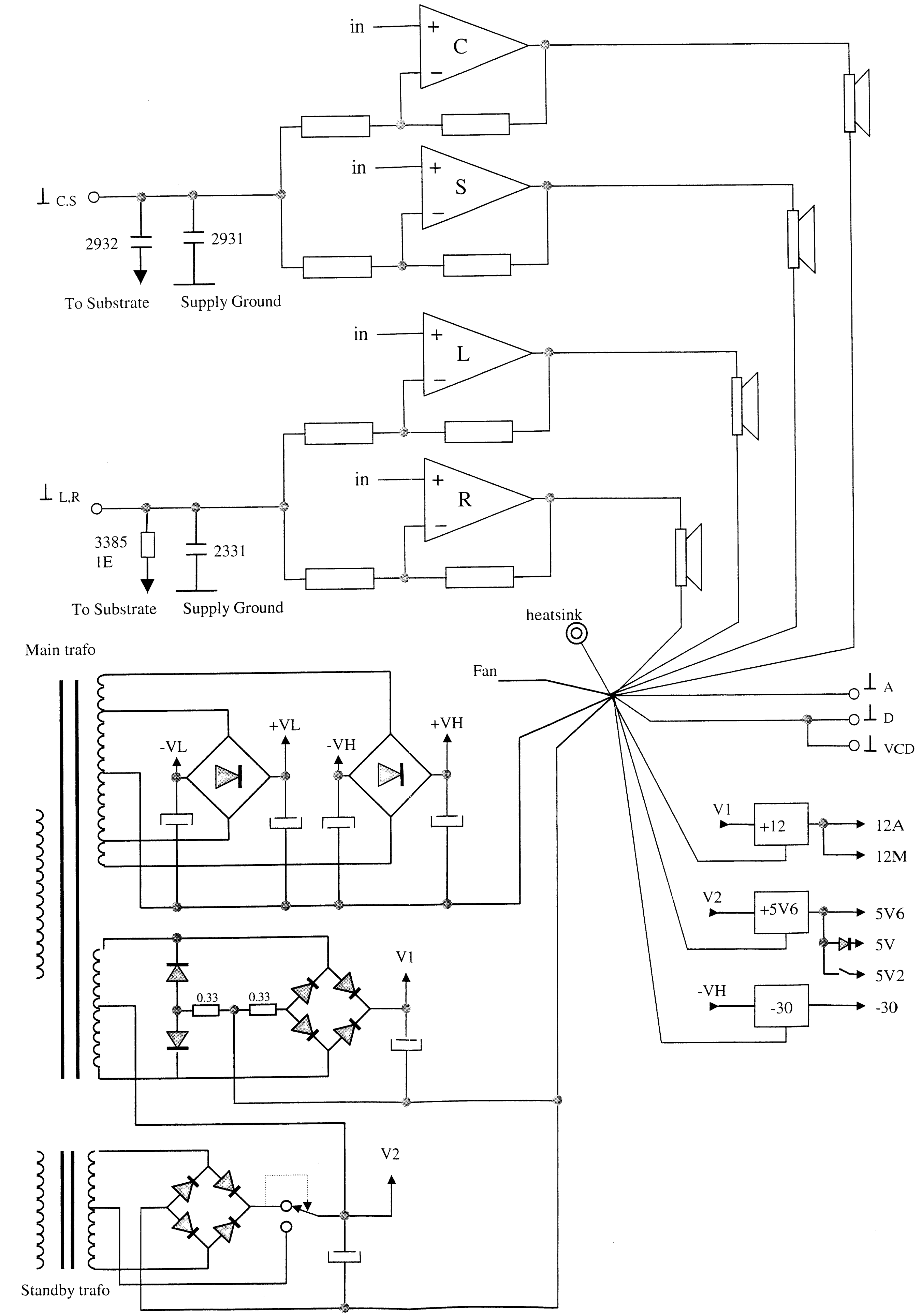
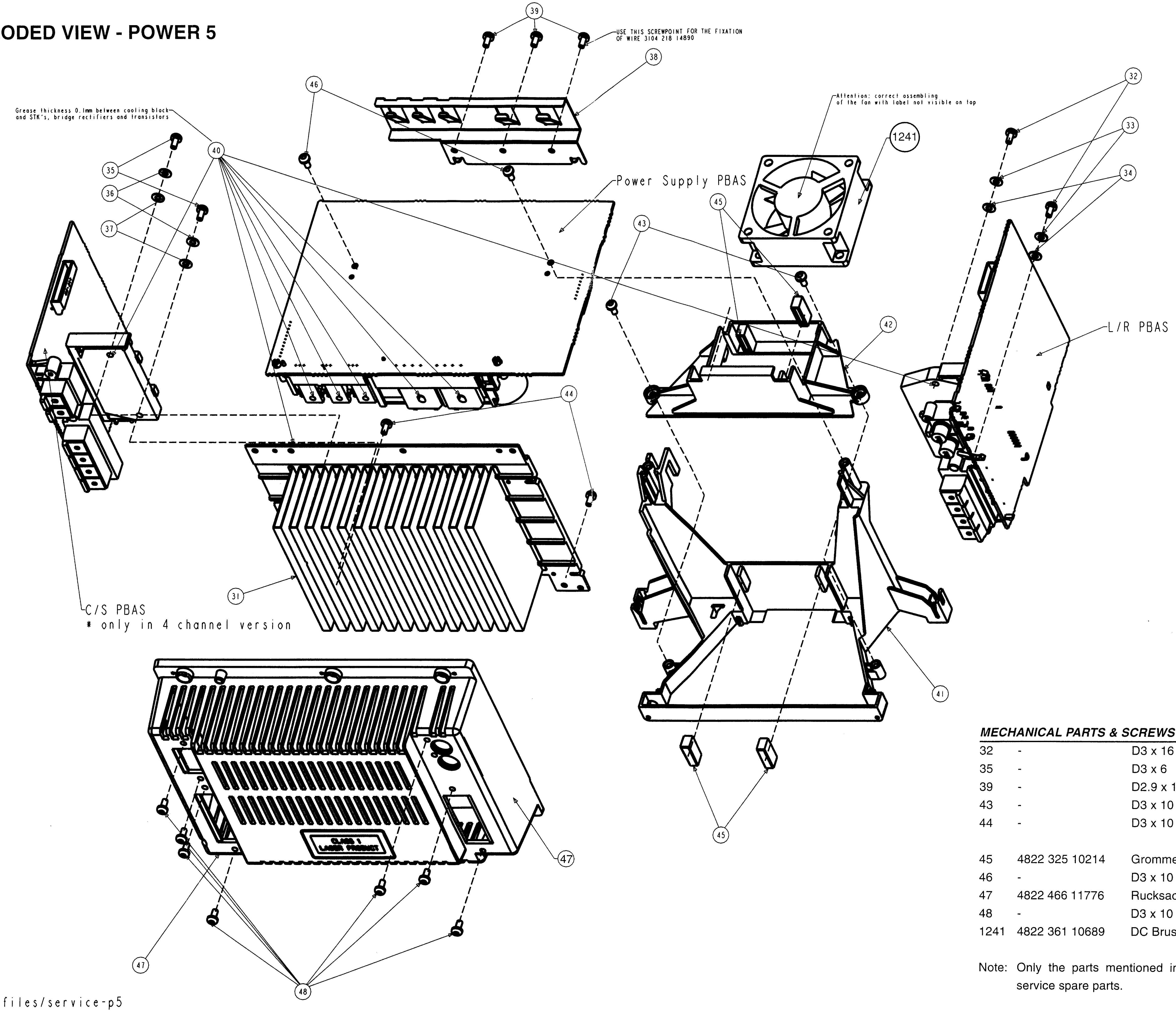
GROUND PLAN MASSA


in
+
C
−
in
+
S
−
in
+
L
−
in
+
R
−
⊥ C.S
2932
2931
To Substrate
Supply Ground
⊥ L,R
3385
1E
2331
To Substrate
Supply Ground
heatsink
Main trafo
Fan
⊥ A
⊥ D
⊥ VCD
-VL
+VL
-VH
+VH
V1
+12
12A
12M
V2
+5V6
5V6
5V
5V2
-VH
-30
-30
0.33
0.33
V1
V2
Standby trafo

EXPLODED VIEW - POWER 5

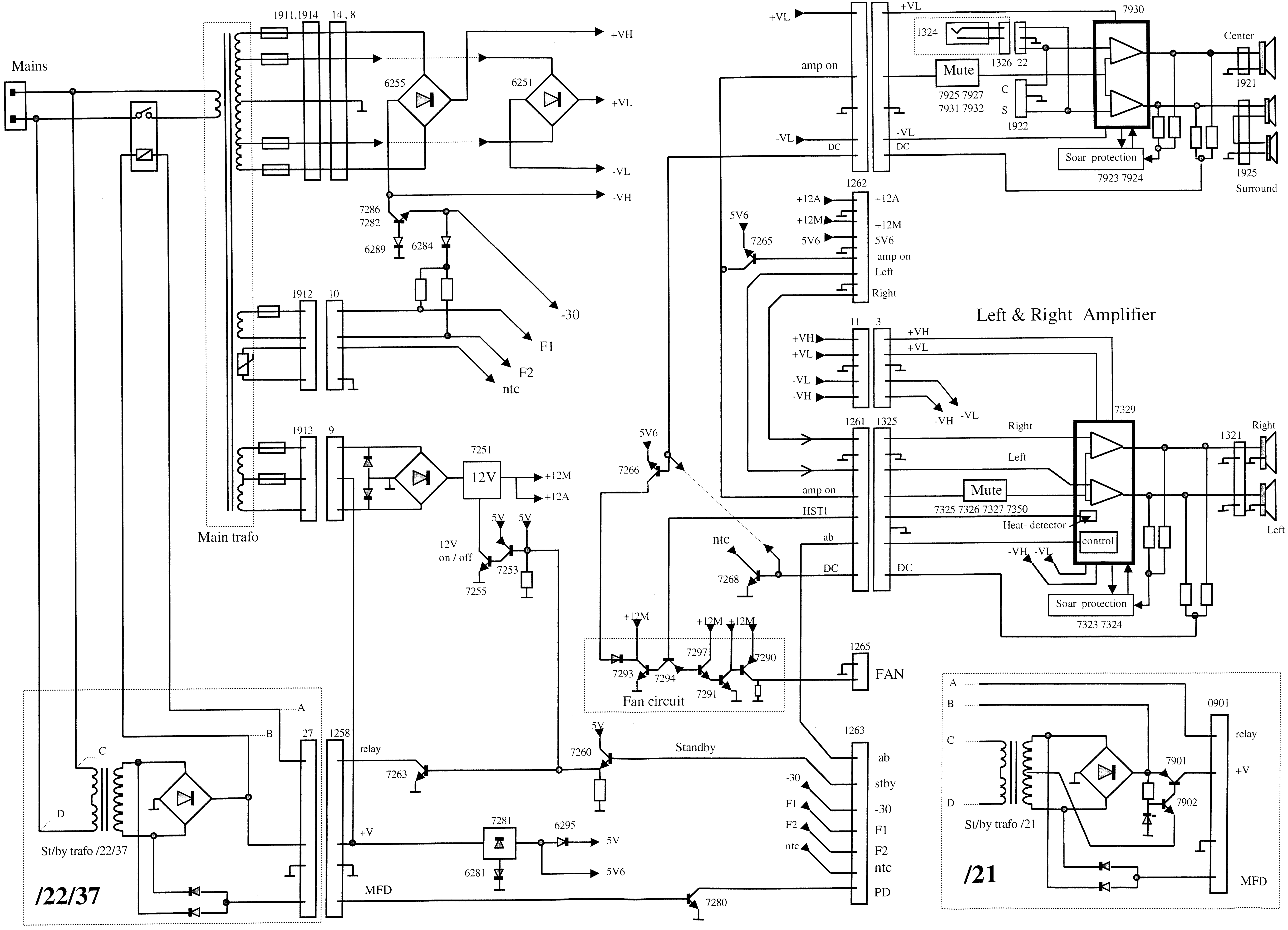

39
USE THIS SCREWPOINT FOR THE FIXATION OF WIRE 3104 218 14890
38
46
Grease thickness 0.1mm between cooling block and STK's, bridge rectifiers and transistors
40
35
36
37
Power Supply PBAS
Attention: correct assembling of the fan with label not visible on top
1241
32
33
34
45
43
42
L/R PBAS
44
31
C/S PBAS
* only in 4 channel version
41
47
45
47
48

MECHANICAL PARTS & SCREWS LIST

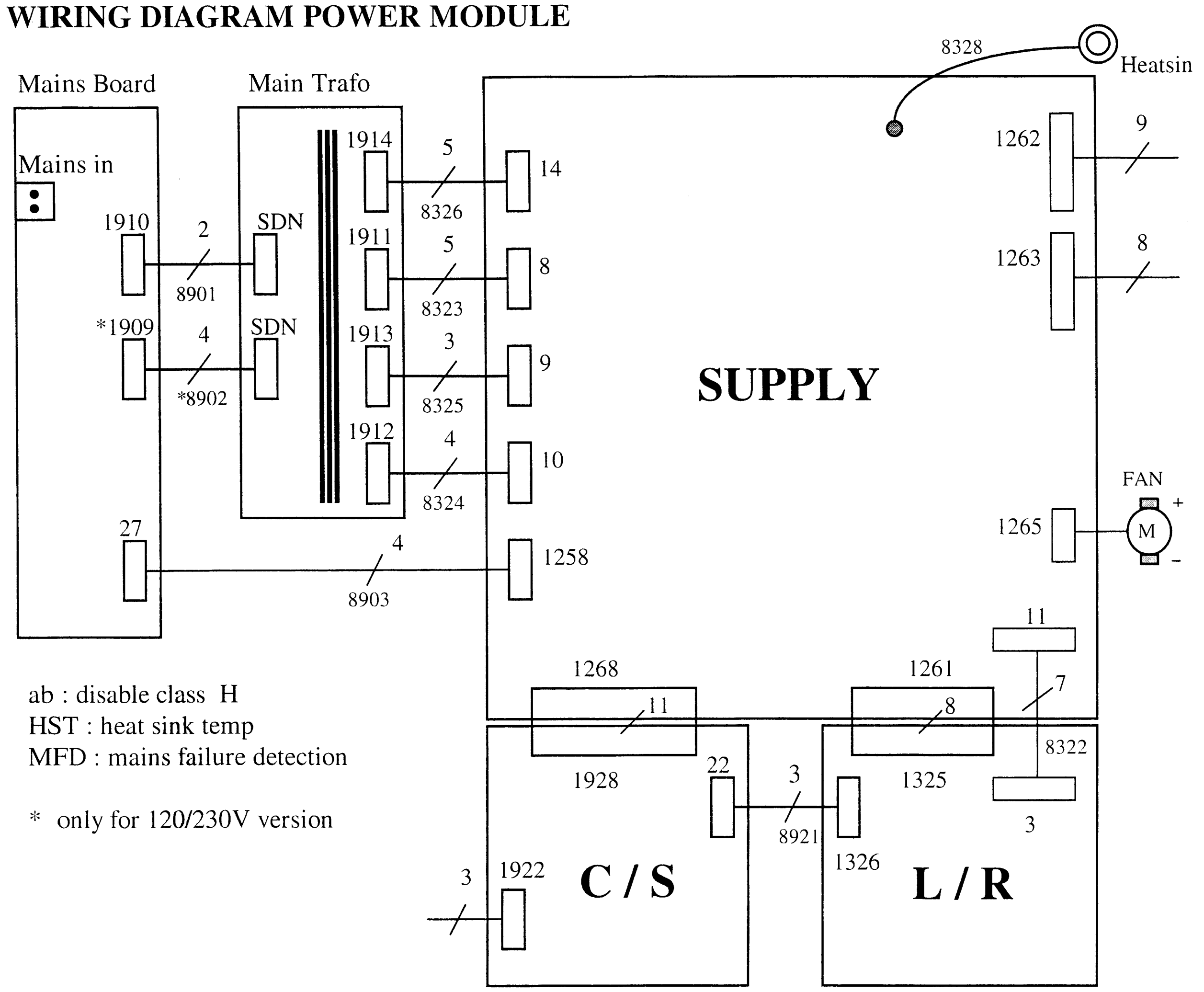
32	-	D3 x 16
35	-	D3 x 6
39	-	D2.9 x 13
43	-	D3 x 10
44	-	D3 x 10
45	4822 325 10214	Grommet
46	-	D3 x 10
47	4822 466 11776	Rucksack P5
48	-	D3 x 10
1241	4822 361 10689	DC Brushless Fan

Note: Only the parts mentioned in this list are normal service spare parts.

Blockdiagram powermodule


Mains
1911,1914
14 , 8
+VH
6255
6251
+VL
-VL
-VH
7286
7282
6289
6284
1912
10
-30
F1
F2
ntc
1913
9
7251
12V
+12M
+12A
12V
on / off
5V
5V
7253
7255
Main trafo
A
B
C
D
27
1258
relay
7263
7260
5V
Standby
+V
7281
6295
5V
5V6
6281
MFD
7280
St/by trafo /22/37
/22/37
Center & Surround Amplifier
1268
1928
+VL
+VL
7930
1324
1326
22
Center
amp on
Mute
7925 7927
7931 7932
C
S
1922
1921
-VL
-VL
DC
DC
Soar protection
7923 7924
1925
Surround
1262
+12A
+12A
+12M
+12M
5V6
5V6
5V6
7265
amp on
Left
Right
Left & Right Amplifier
11
3
+VH
+VH
+VL
+VL
-VL
-VH
-VH
-VL
7329
5V6
1261
1325
Right
Right
1321
7266
Left
amp on
Mute
7325 7326 7327 7350
Left
HST1
Heat- detector
ntc
ab
control
-VH
-VL
7268
DC
DC
Soar protection
7323 7324
+12M
+12M
+12M
7297
7290
1265
7293
7294
FAN
7291
Fan circuit
1263
ab
stby
-30
-30
F1
F1
F2
F2
ntc
ntc
PD
A
B
0901
relay
C
7901
+V
D
7902
St/by trafo /21
/21
MFD

WIRING DIAGRAM POWER MODULE


8328
Heatsin
Mains Board
Main Trafo
Mains in
1910
2
8901
SDN
*1909
4
*8902
SDN
1914
5
8326
14
1911
5
8323
8
1913
3
8325
9
1912
4
8324
10
27
4
8903
1258
SUPPLY
1262
9
1263
8
FAN
1265
M
+
-
11
7
8322
3
1268
11
1261
8
1928
22
3
8921
1325
1326
1922
C / S
L / R

ab : disable class H
HST : heat sink temp
MFD : mains failure detection

* only for 120/230V version

Information indicator on connectors:

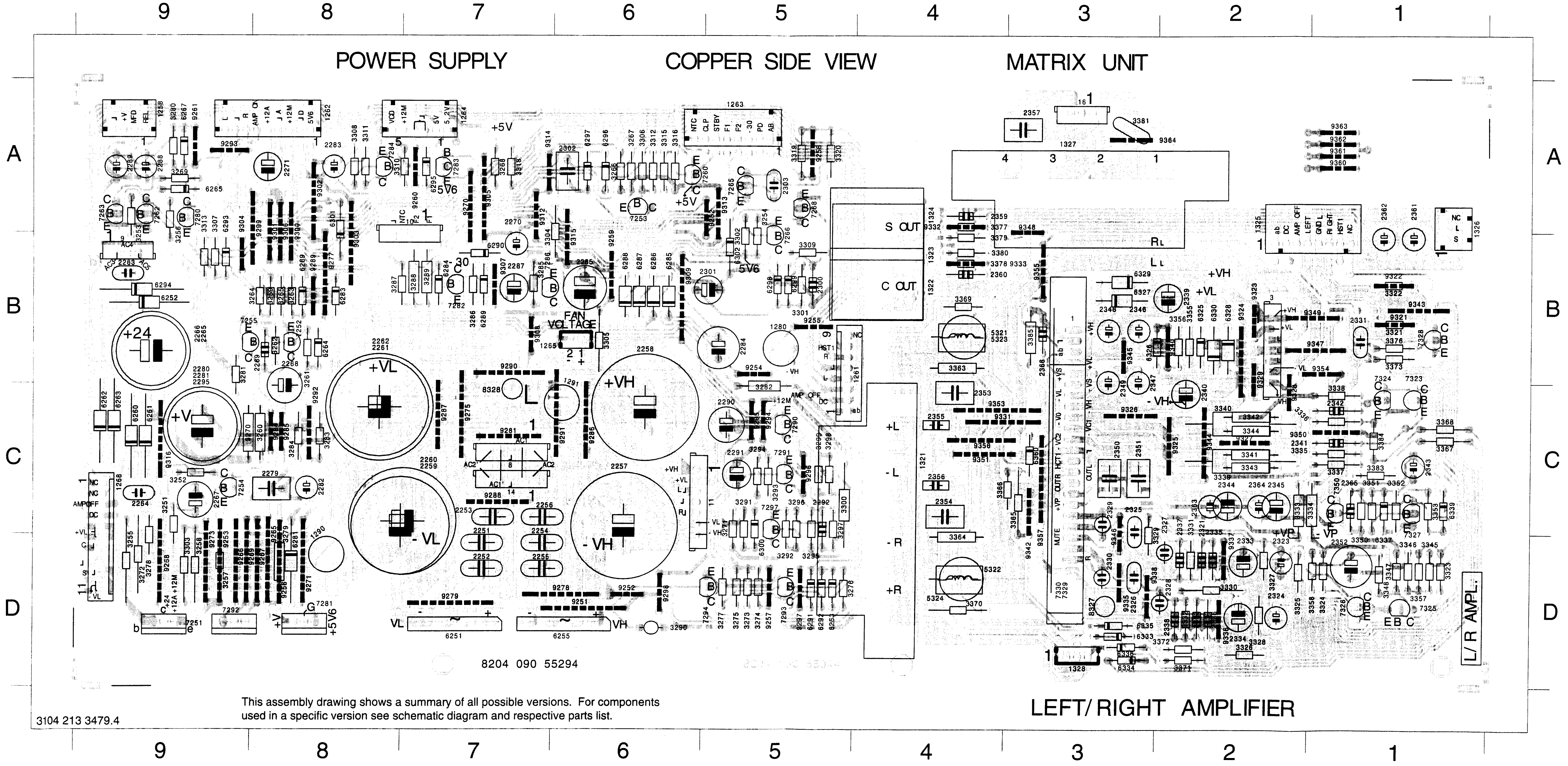
1268 to 1928	1262	1263	1261 to 1325
1: NC	1: +5.6V	1: ab	1: ab
2: NC	2: GNDD	2: PD	2: DC
3: AMP OFF	3: +12M	3: -30	3: AMP OFF
4: DC	4: GNDA	4: F2	4: L
5: +VL	5: +12A	5: F1	5: GND
6: +VL	6: AMP ON	6: ST.BY	6: R
7: GNDC	7: Rin	7: CLIP	7: HST1
8: GND	8: GND	8: NTC	8: NC
9: GNDS	9: Lin		
10: -VL			
11: -VL			

11 to 3	1264	1911 to 8	1914 to 14	1912 to 10	1909
1: + VH	1: 5.2V	1: AC2	1: AC2	1: F1	1: 0VA
2: + VL	2: 5V	2: AC1	2: AC1	2: F2	2: 120VB
3: GNDL	3: GND	3: GND	3: GND	3: NTC	3: 10VB
4: GND	4: GND	4: AC1'	4: AC1'	4: GND	4: 0VB
5: GNDR	5: +12M	5: AC2'	5: AC2'		
6: - VL	6: VCD				
7: - VH					

1265	1910	1922	1326 to 22	1913 to 9	1258 to 27
1 : +	1 : ACA	1: Surround	1: Surround	1: AC3	1: REL
2: -	2: FUSE	2: GND	2: GND	2: AC4	2: MFD
		3: Center	3: Center	3: AC5	3: +V
					4: GND

PS & L/R AMP. BOARD LAYOUT

3381 A 3	9304 B 9	9289 B 8	9268 D 9	9251 D 6	7266 B 5	6297 A 6	6281 D 8	3318 A 7	3301 B 5	3286 B 7	3271 C 5	3256 A 9	2288 A 9	2265 B 9	1291 C 6	----	9342 C 3	9323 B 2	6337 C 1	3385 B 3	3366 C 3	3345 D 1	3330 D 2	2361 B 1	2344 C 2	2328 D 2	3 B 2
9360 A 1	9305 A 7	9290 B 7	9269 D 9	9252 D 6	7268 A 5	6298 B 5	6283 B 8	3319 A 5	3302 B 5	3287 B 8	3272 D 9	3257 D 9	2289 A 9	2266 B 9	2251 D 7	8 C 7	9343 B 1	9324 B 2	6339 C 1	5321 B 4	3367 C 1	3346 D 1	3331 D 2	2362 B 1	2345 C 2	2329 C 3	1321 C 4
9361 A 1	9306 B 8	9291 C 6	9270 A 7	9253 D 9	7280 A 9	6299 B 5	6284 B 7	3320 A 5	3303 D 9	3288 B 7	3273 D 5	3258 D 9	2290 C 5	2267 C 9	2252 D 7	9 B 9	9344 C 2	9325 C 2	6360 C 3	5322 D 4	3368 C 1	3347 D 1	3332 D 2	2363 C 2	2346 B 3	2330 D 3	1322 B 4
9362 A 1	9307 B 7	9292 C 8	9271 D 8	9254 B 5	7281 D 8	6300 C 5	6285 B 6	6251 D 7	3304 B 6	3289 B 7	3274 D 5	3259 B 8	2291 C 5	2268 C 8	2253 C 7	10 B 7	9345 B 3	9326 C 3	7323 C 1	5323 B 4	3369 B 4	3348 D 1	3333 C 2	2364 C 2	2347 B 3	2331 B 1	1323 B 4
9363 A 1	9308 B 7	9293 A 9	9273 D 9	9255 B 5	7282 B 7	6301 A 8	6286 B 6	6252 B 9	3305 B 6	3290 D 6	3275 D 5	3260 C 8	2292 C 5	2269 B 8	2254 D 7	11 C 6	9346 C 3	9327 C 2	7324 C 1	5324 D 4	3370 D 4	3350 C 1	3334 C 1	2365 C 1	2348 B 3	2333 D 2	1324 A 4
9364 A 3	9309 B 6	9294 C 5	9275 C 7	9256 D 8	7283 A 7	6302 B 5	6287 B 6	6253 D 5	3306 A 6	3291 C 5	3276 D 5	3261 B 8	2295 C 9	2270 B 7	2255 D 7	14 C 7	9347 B 1	9328 C 2	7325 D 1	6325 B 2	3371 D 2	3351 C 1	3335 C 1	2366 B 3	2349 B 3	2334 D 2	1325 B 1
	9312 A 7	9295 C 5	9277 B 8	9257 D 5	7284 A 8	7251 D 9	6288 B 6	6255 D 6	3307 B 9	3292 C 5	3277 D 5	3262 B 8	2300 B 5	2271 A 8	2256 C 7	1258 A 9	9348 B 3	9329 B 2	7326 D 1	6326 B 3	3372 D 2	3352 C 1	3336 C 1	3321 B 1	2350 C 3	2335 D 2	1326 A 1
	9313 A 5	9296 C 5	9278 D 6	9258 A 5	7286 B 7	7252 B 8	6289 B 7	6260 C 9	3308 A 8	3293 C 5	3278 D 9	3263 B 8	2301 B 5	2279 C 8	2257 C 6	1261 B 5	9349 B 1	9331 C 4	7327 C 1	6327 B 3	3373 B 1	3353 C 1	3337 C 1	3322 B 1	2351 C 3	2336 D 2	1328 D 3
	9314 A 7	9297 D 5	9279 D 7	9259 B 6	7290 C 5	7253 A 6	6290 B 7	6261 C 9	3309 B 5	3294 C 5	3279 D 8	3264 B 8	2302 A 6	2280 C 9	2258 C 6	1262 A 8	9350 C 1	9332 A 4	7328 B 1	6328 B 2	3376 B 1	3355 B 2	3338 C 1	3323 D 1	2352 D 1	2337 D 2	2321 D 2
	9315 B 6	9298 D 6	9281 C 7	9260 A 7	7291 C 5	7254 C 9	6291 D 5	6262 C 9	3310 A 7	3295 C 5	3280 A 9	3265 B 8	2303 A 5	2281 C 9	2259 C 7	1263 A 5	9351 C 4	9333 B 4	7329 C 3	6329 B 3	3377 A 4	3356 B 2	3339 C 2	3324 D 1	2353 C 4	2338 D 2	2322 D 2
	9316 C 9	9299 A 8	9284 C 8	9261 A 9	7292 D 9	7255 B 9	6292 D 5	6263 C 9	3311 A 8	3296 C 5	3281 B 9	3266 A 6	3251 C 9	2282 C 8	2260 C 8	1264 A 7	9353 C 4	9335 D 3	7330 C 3	6330 B 2	3378 B 4	3357 D 1	3340 C 2	3325 D 2	2354 C 4	2339 B 2	2323 D 2
	----	9300 B 8	9285 C 8	9262 A 5	7293 D 5	7260 A 6	6293 B 9	6264 B 8	3312 A 6	3297 C 5	3282 C 5	3267 A 6	3252 C 9	2283 A 8	2261 C 8	1265 B 6	9354 B 1	9336 D 2	7350 C 1	6333 D 3	3379 B 4	3358 D 1	3341 C 2	3326 D 2	2355 C 4	2340 C 2	2324 D 2
	16 A 3	9301 B 8	9286 C 6	9265 D 8	7294 D 5	7262 A 9	6294 B 9	6265 A 9	3313 B 9	3298 C 5	3283 C 8	3268 A 7	3253 A 9	2284 B 5	2262 C 8	1268 D 9	9355 B 3	9337 D 2	8327 D 3	6334 D 3	3380 B 4	3363 B 4	3342 C 2	3327 D 2	2356 C 4	2341 C 1	2325 C 3
	1327 A 3	9302 A 8	9287 C 7	9266 D 9	7297 C 5	7263 A 9	6295 A 7	6267 A 9	3315 A 6	3299 C 5	3284 C 8	3269 A 9	3254 B 5	2285 B 6	2263 B 9	1280 B 5	9356 C 4	9338 D 3	9321 B 1	6335 D 3	3383 C 1	3364 D 4	3343 C 2	3328 D 2	2359 A 4	2342 C 1	2326 D 3
	2357 A 3	9303 B 8	9288 C 7	9267 D 8	8328 C 7	7265 A 5	6296 A 6	6269 B 8	3316 A 6	3300 C 5	3285 B 7	3270 C 9	3255 D 9	2287 B 7	2264 C 9	1290 D 8	9357 C 3	9340 B 2	9322 B 1	6336 D 3	3384 C 1	3365 C 3	3344 C 2	3329 D 3	2360 B 4	2343 C 1	2327 D 2



This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

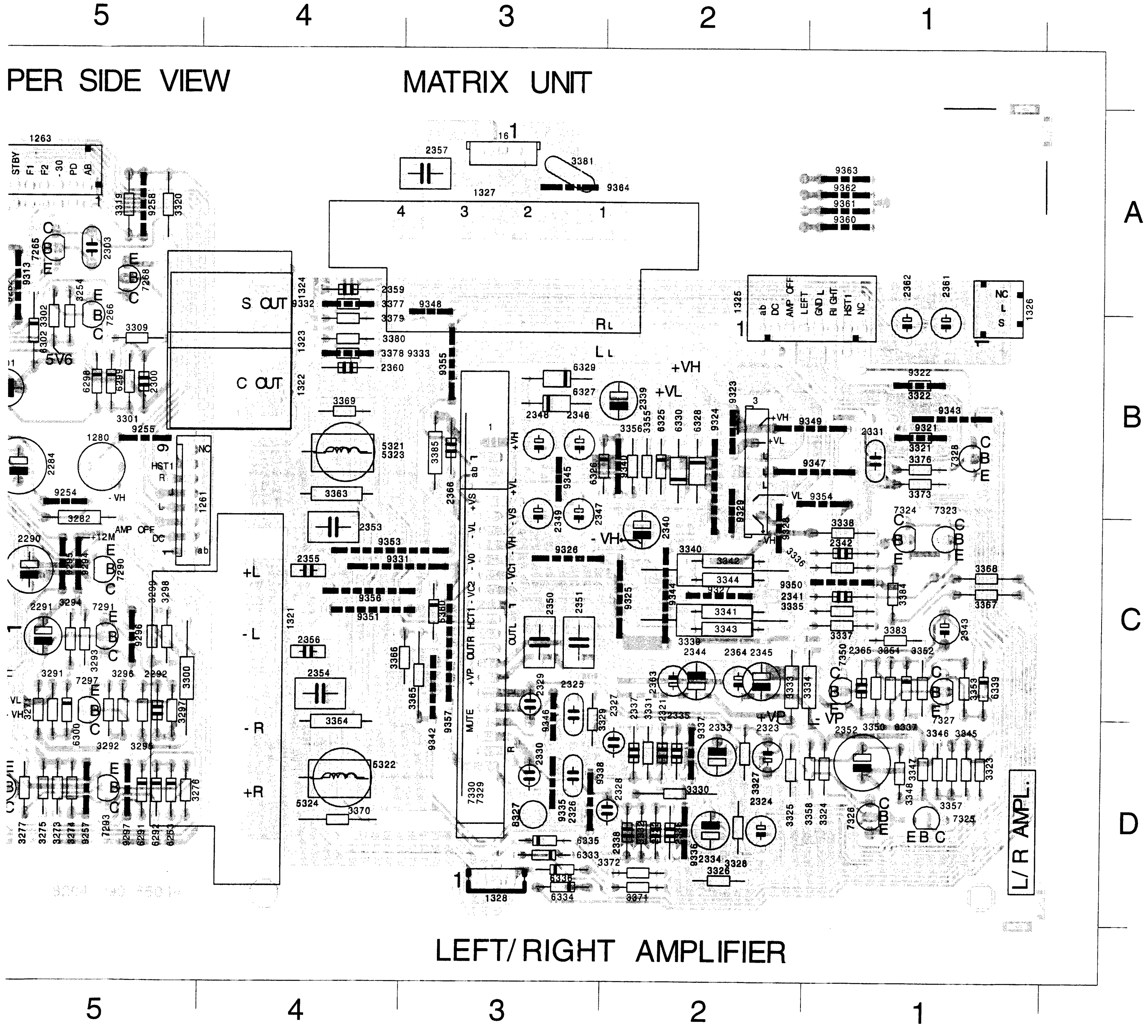
MAINS BO

trf5 D 3	27 B 1
trf6 C 3	1901 D 2
trf7 C 3	1902 D 1
trf8 C 3	1905 C 2
----	1906 C 1
1911 A 3	1907 D 1
1912 B 3	1909 C 1
1913 B 3	1910 C 1
1914 A 3	2902 A 2
1920 A 3	2903 A 2
1921 A 3	2904 A 1
1922 A 3	2905 A 1
1923 B 3	2906 B 1
1924 B 3	3901 B 1
1925 C 3	3902 A 1
3920 B 3	3903 A 1
9930 B 3	3904 A 1
9931 A 3	3905 A 1
9932 A 3	3906 A 1
9933 A 3	
9934 A 3	5901 C 2
9935 A 3	5902 C 2
9936 B 3	5903 B 2
9937 B 3	5904 B 2
9938 B 3	5905 B 1
9939 B 3	6901 A 2
9940 B 3	6902 A 2
9941 B 3	6903 A 2
9942 C 3	6904 A 2
trf10 A 3	6905 A 2
trf11 A 3	6906 A 1
trf12 A 3	6908 B 1
trf13 A 3	6909 A 1
trf14 A 3	6910 A 1
trf15 B 3	6911 B 1
trf16 B 3	6912 B 1
trf17 B 3	7901 A 1
trf18 B 3	7902 A 1
trf19 B 3	9901 C 2
trf20 B 3	9902 C 2
trf21 C 3	9903 C 2
	9904 C 1
	9905 C 1
	9906 D 1
	9907 B 2
	9908 B 2
	9909 B 2
	9910 A 1
	9911 A 1
	9912 A 1
	9913 A 1
	9914 A 1
	9915 C 1
	9916 C 2
	9917 C 1
	9918 C 2

	8901 D 3
	8902 C 3
	9920 D 3
	9921 D 3
	9922 D 3
	9923 C 3
	9924 C 3
	9925 C 3
	trf3 D 3
	trf4 D 3

3256	A 9
3257	D 9
3258	D 9
3259	B 8
3260	C 8
3261	B 8
3262	B 8
3263	B 8
3264	B 8
3265	B 8
3266	A 6
3267	A 6
3268	A 7
3269	A 9
3270	C 9
2288	A 9
2289	A 9
2290	C 5
2291	C 5
2292	C 5
2295	C 9
2300	B 5
2301	B 5
2302	A 6
2303	A 5
3251	C 9
3252	C 9
3253	A 9
3254	B 5
3255	D 9
2265	B 9
2266	B 9
2267	C 9
2268	C 8
2269	B 8
2270	B 7
2271	A 8
2279	C 8
2280	C 9
2281	C 9
2282	C 8
2283	A 8
2284	B 5
2285	B 6
2287	B 7
1291	C 6
2251	D 7
2252	D 7
2253	C 7
2254	D 7
2255	D 7
2256	C 7
2257	C 6
2258	C 6
2259	C 7
2260	C 8
2261	C 8
2262	C 8
2263	B 9
2264	C 9

8	C 7
9	B 9
10	B 7
11	C 6
14	C 7
1258	A 9
1261	B 5
1262	A 8
1263	A 5
1264	A 7
1265	B 6
1268	D 9
1280	B 5
1290	D 8
9342	C 3
9343	B 1
9344	C 2
9345	B 3
9346	C 3
9347	B 1
9348	B 3
9349	B 1
9350	C 1
9351	C 4
9353	C 4
9354	B 1
9355	B 3
9356	C 4
9357	C 3
9323	B 2
9324	B 2
9325	C 2
9326	C 3
9327	C 2
9328	C 2
9329	B 2
9331	C 4
9332	A 4
9333	B 4
9335	D 3
9336	D 2
9337	D 2
9338	D 3
9340	B 2
6337	C 1
6339	C 1
6360	C 3
7323	C 1
7324	C 1
7325	D 1
7326	D 1
7327	C 1
7328	B 1
7329	C 3
7330	C 3
7350	C 1
8327	D 3
9321	B 1
9322	B 1
3385	B 3
5321	B 4
5322	D 4
5323	B 4
5324	D 4
6325	B 2
6326	B 3
6327	B 3
6328	B 2
6329	B 3
6330	B 2
6333	D 3
6334	D 3
6335	D 3
6336	D 3
3366	C 3
3367	C 1
3368	C 1
3369	B 4
3370	D 4
3371	D 2
3372	D 2
3373	B 1
3376	B 1
3377	A 4
3378	B 4
3379	B 4
3380	B 4
3383	C 1
3384	C 1
3345	D 1
3346	D 1
3347	D 1
3348	D 1
3350	C 1
3351	C 1
3352	C 1
3353	C 1
3355	B 2
3356	B 2
3357	D 1
3358	D 1
3363	B 4
3364	D 4
3365	C 3
3330	D 2
3331	D 2
3332	D 2
3333	C 2
3334	C 1
3335	C 1
3336	C 1
3337	C 1
3338	C 1
3339	C 2
3340	C 2
3341	C 2
3342	C 2
3343	C 2
3344	C 2
2361	B 1
2362	B 1
2363	C 2
2364	C 2
2365	C 1
2366	B 3
3321	B 1
3322	B 1
3323	D 1
3324	D 1
3325	D 2
3326	D 2
3327	D 2
3328	D 2
3329	D 3
2344	C 2
2345	C 2
2346	B 3
2347	B 3
2348	B 3
2349	B 3
2350	C 3
2351	C 3
2352	D 1
2353	C 4
2354	C 4
2355	C 4
2356	C 4
2359	A 4
2360	B 4
2328	D 2
2329	C 3
2330	D 3
2331	B 1
2333	D 2
2334	D 2
2335	D 2
2336	D 2
2337	D 2
2338	D 2
2339	B 2
2340	C 2
2341	C 1
2342	C 1
2343	C 1
3	B 2
1321	C 4
1322	B 4
1323	B 4
1324	A 4
1325	B 1
1326	A 1
1328	D 3
2321	D 2
2322	D 2
2323	D 2
2324	D 2
2325	C 3
2326	D 3
2327	D 2

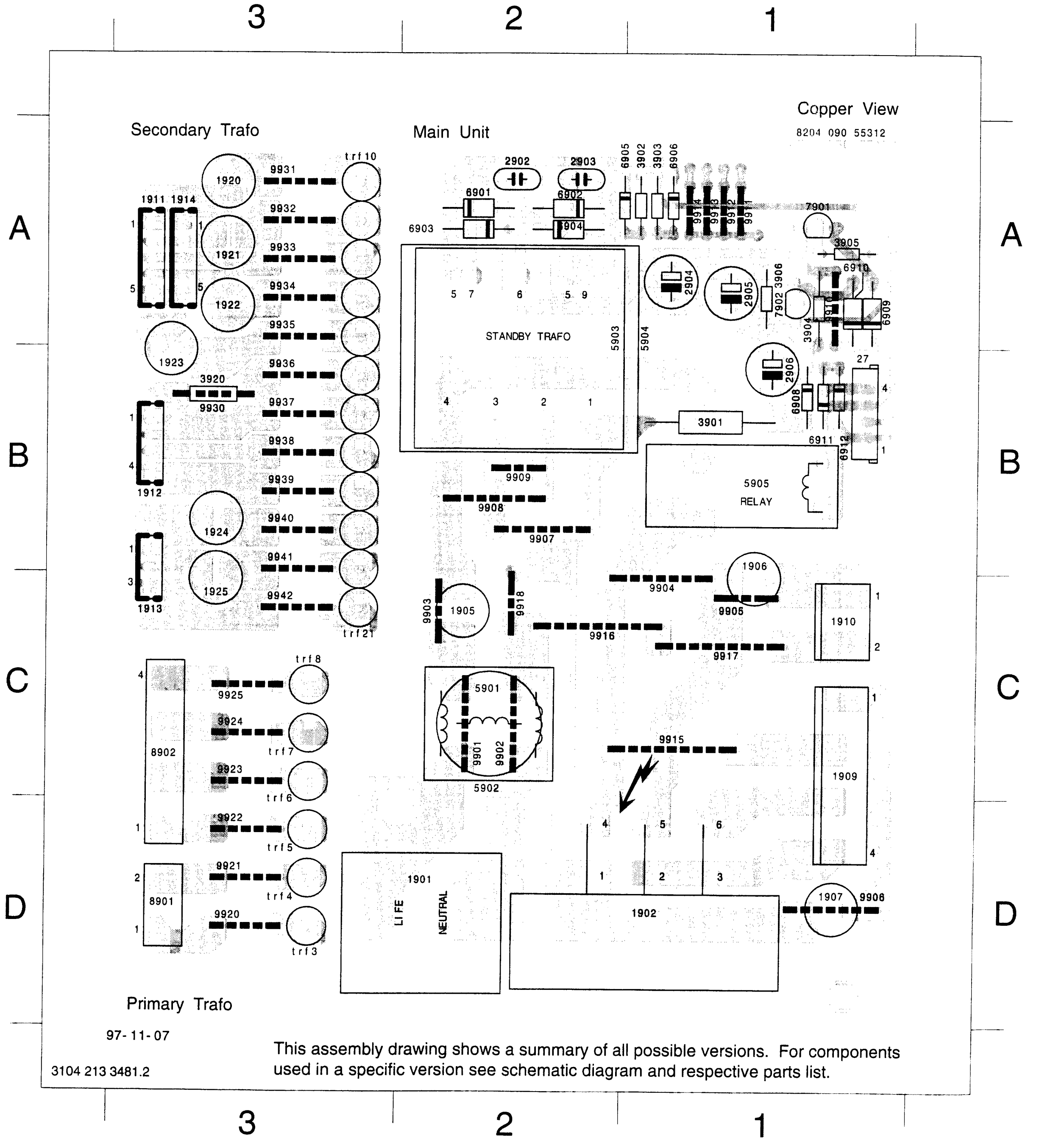


MAINS BOARD LAYOUT

trf5	D 3
trf6	C 3
trf7	C 3
trf8	C 3

1911	A 3
1912	B 3
1913	B 3
1914	A 3
1920	A 3
1921	A 3
1922	A 3
1923	B 3
1924	B 3
1925	C 3
3920	B 3
9930	B 3
9931	A 3
9932	A 3
9933	A 3
9934	A 3
9935	A 3
9936	B 3
9937	B 3
9938	B 3
9939	B 3
9940	B 3
9941	B 3
9942	C 3
trf10	A 3
trf11	A 3
trf12	A 3
trf13	A 3
trf14	A 3
trf15	B 3
trf16	B 3
trf17	B 3
trf18	B 3
trf19	B 3
trf20	B 3
trf21	C 3
27	B 1
1901	D 2
1902	D 1
1905	C 2
1906	C 1
1907	D 1
1909	C 1
1910	C 1
2902	A 2
2903	A 2
2904	A 1
2905	A 1
2906	B 1
3901	B 1
3902	A 1
3903	A 1
3904	A 1
3905	A 1
3906	A 1
5901	C 2
5902	C 2
5903	B 2
5904	B 2
5905	B 1
6901	A 2
6902	A 2
6903	A 2
6904	A 2
6905	A 2
6906	A 1
6908	B 1
6909	A 1
6910	A 1
6911	B 1
6912	B 1
7901	A 1
7902	A 1
9901	C 2
9902	C 2
9903	C 2
9904	C 1
9905	C 1
9906	D 1
9907	B 2
9908	B 2
9909	B 2
9910	A 1
9911	A 1
9912	A 1
9913	A 1
9914	A 1
9915	C 1
9916	C 2
9917	C 1
9918	C 2

8901	D 3
8902	C 3
9920	D 3
9921	D 3
9922	D 3
9923	C 3
9924	C 3
9925	C 3
trf3	D 3
trf4	D 3

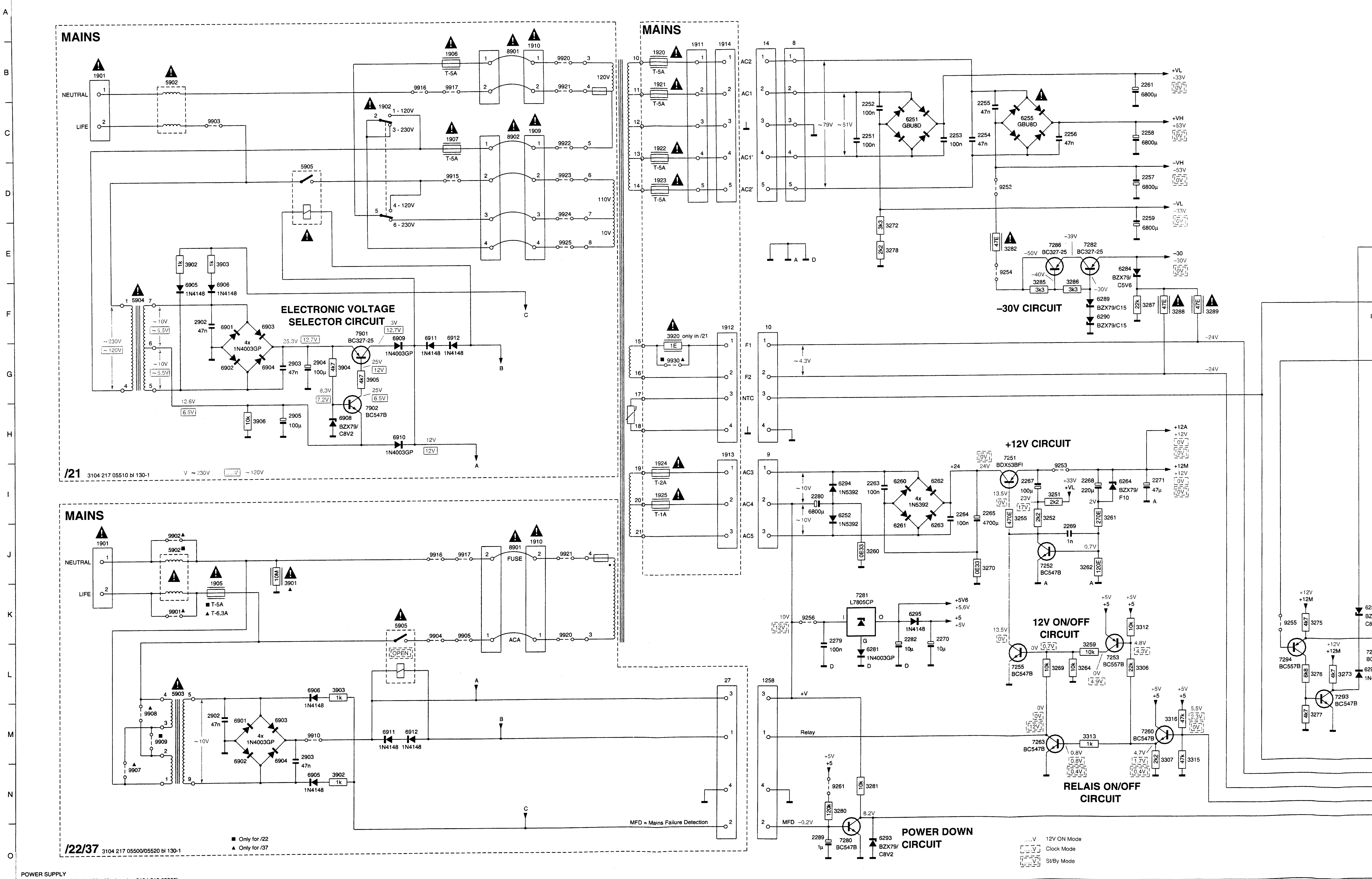


97-11-07

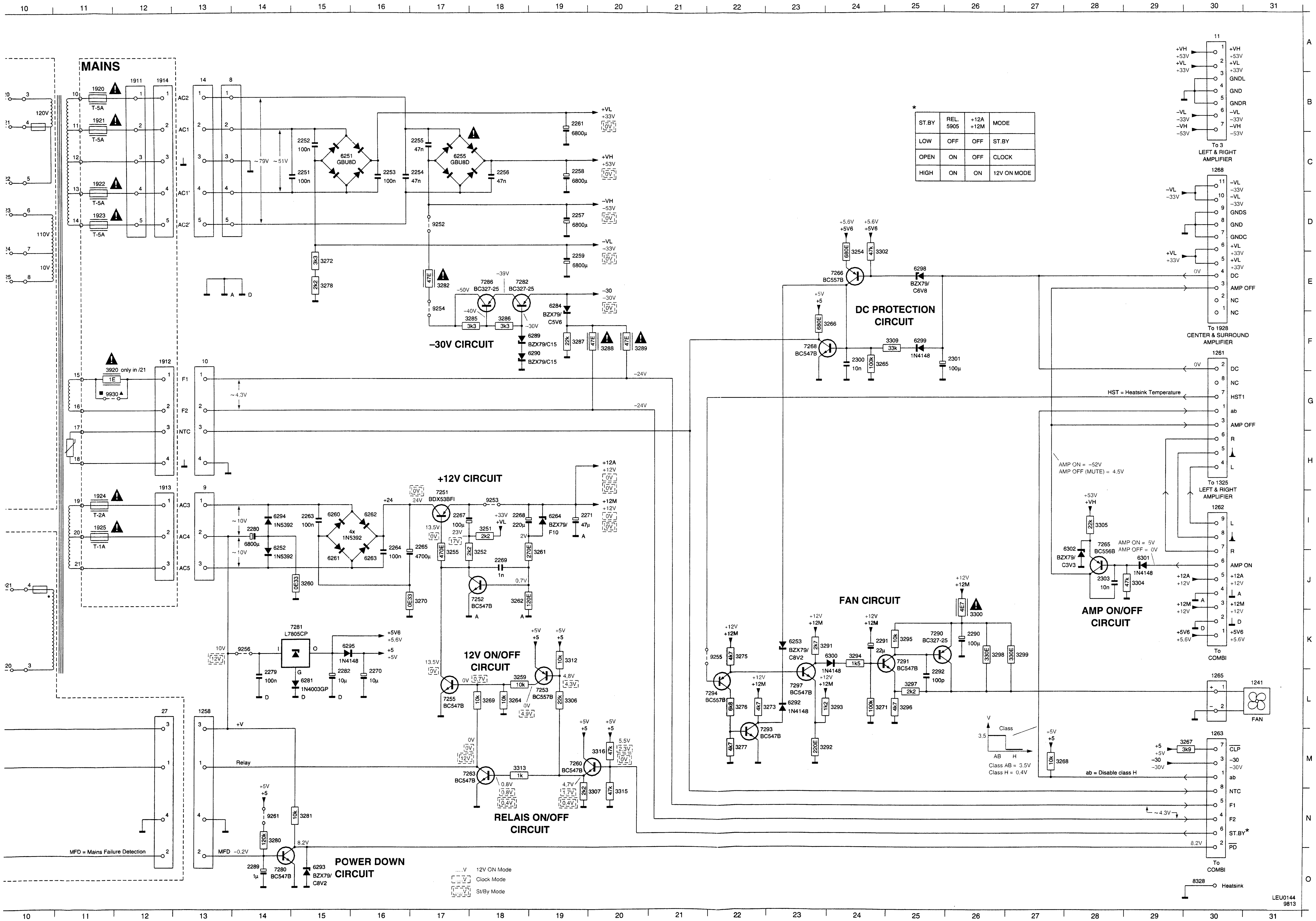
This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

3104 213 3481.2

POWER SUPPLY (2x 130W + C/S)


MAINS
NEUTRAL
LIFE
1901
5902
1902
1 - 120V
3 - 230V
4 - 120V
6 - 230V
1906
T-5A
1907
1909
1910
8901
8902
120V
110V
10V
5905
5904
ELECTRONIC VOLTAGE SELECTOR CIRCUIT
7901
BC327-25
7902
BC547B
6908
BZX79/ C8V2
6910
1N4003GP
4x 1N4003GP
/21 3104 217 05510 bl 130-1
V ~230V
V ~120V
MAINS
1911
1914
1920
1921
1922
1923
AC1
AC2
AC1'
AC2'
6251 GBU8D
6255 GBU8D
+VL -33V
+VH +53V
-VH -53V
-VL -33V
-30V CIRCUIT
7286 BC327-25
7282 BC327-25
6284 BZX79/ C5V6
-30 -30V
-24V
1912
3920 only in /21
F1
F2
NTC
1913
1924
T-2A
1925
T-1A
AC3
AC4
AC5
+12V CIRCUIT
7251 BDX53BFI
7252 BC547B
4x 1N5392
+12A +12V
+12M +12V
7281 L7805CP
+5V6 +5,6V
+5 +5V
12V ON/OFF CIRCUIT
7255 BC547B
7253 BC547B
RELAIS ON/OFF CIRCUIT
7263 BC547B
7260 BC547B
POWER DOWN CIRCUIT
7280 BC547B
6293 BZX79/ C8V2
MFD = Mains Failure Detection
Relay
MFD
MAINS
FUSE
ACA
5903
9907
9908
9909
1905
■ T-5A
▲ T-6,3A
3901
■ Only for /22
▲ Only for /37
/22/37 3104 217 05500/05520 bl 130-1
7294 BC557B
7293 BC547B
V 12V ON Mode
V Clock Mode
V St/By Mode

POWER SUPPLY
3104 217 05470/05490 bl. 130 - 02 (version 3104 219 03260)

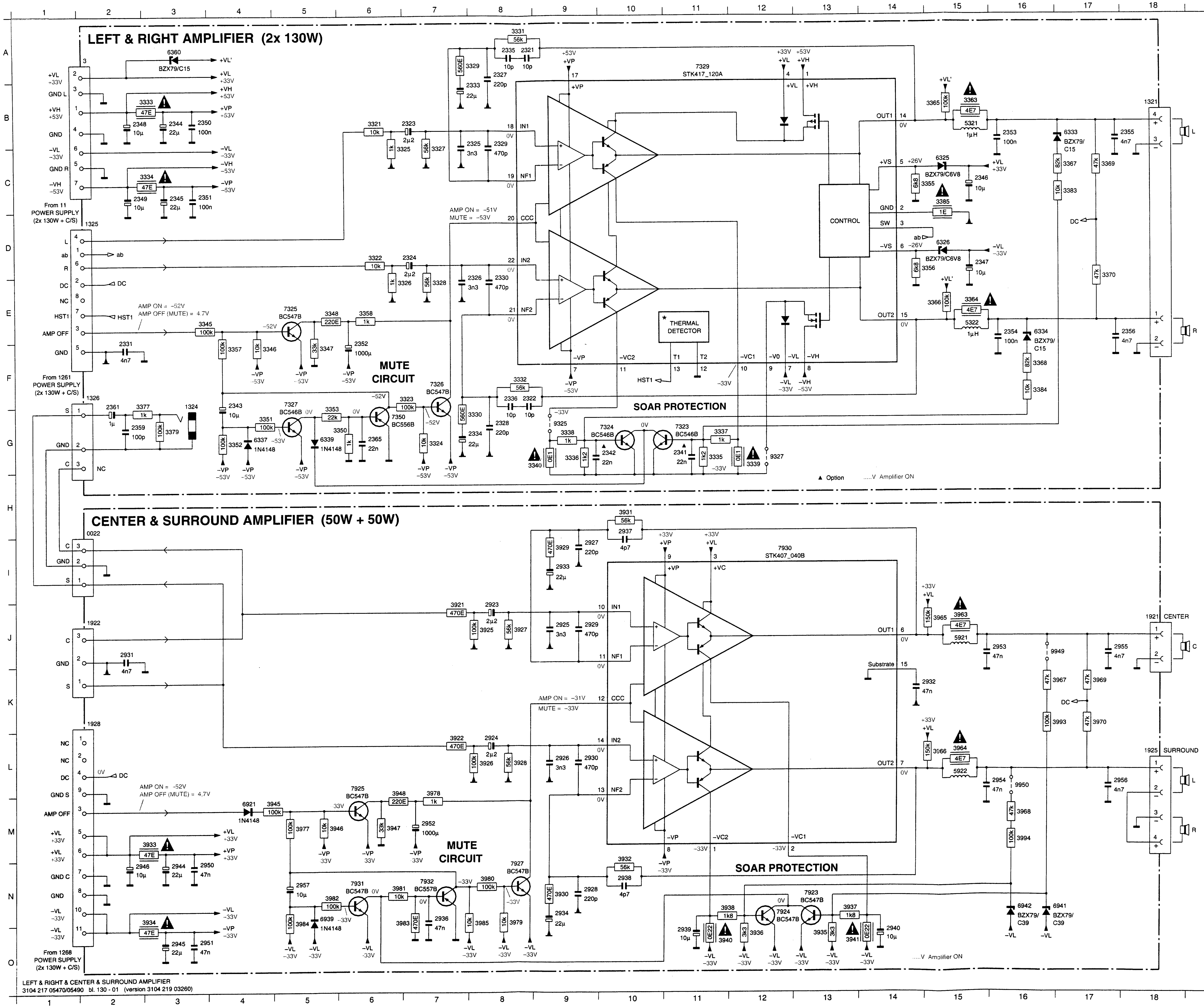

MAINS
-30V CIRCUIT
+12V CIRCUIT
12V ON/OFF CIRCUIT
RELAIS ON/OFF CIRCUIT
POWER DOWN CIRCUIT
DC PROTECTION CIRCUIT
FAN CIRCUIT
AMP ON/OFF CIRCUIT
To 3 LEFT & RIGHT AMPLIFIER
To 1928 CENTER & SURROUND AMPLIFIER
To 1325 LEFT & RIGHT AMPLIFIER
To COMBI
FAN
HST = Heatsink Temperature
AMP ON = -52V
AMP OFF (MUTE) = 4.5V
AMP ON = 5V
AMP OFF = 0V
ab = Disable class H
Class AB = 3.5V
Class H = 0.4V
MFD = Mains Failure Detection
3920 only in /21
Relay
+VL +33V
+VH +53V
-VH -53V
-VL -33V
-30 -30V
+12A +12V
+12M +12V
+5V6 +5.6V
+5 +5V
GBU8D
L7805CP
BDX53BFI
BC327-25
BC547B
BC557B
BC556B
BZX79/C5V6
BZX79/C15
BZX79/F10
BZX79/C6V8
BZX79/C8V2
BZX79/C3V3
1N4148
1N5392
1N4003GP
T-5A
T-2A
T-1A
AC1
AC2
AC1'
AC2'
AC3
AC4
AC5
F1
F2
NTC
DC
NC
AMP OFF
AMP ON
HST1
ab
R
L
GNDL
GND
GNDR
GNDS
GNDC
CLP
ST.BY*
PD
Heatsink
LEU0144
9813

*

ST.BY	REL. 5905	+12A +12M	MODE
LOW	OFF	OFF	ST.BY
OPEN	ON	OFF	CLOCK
HIGH	ON	ON	12V ON MODE

.....V 12V ON Mode
[V] Clock Mode
[V] St/By Mode

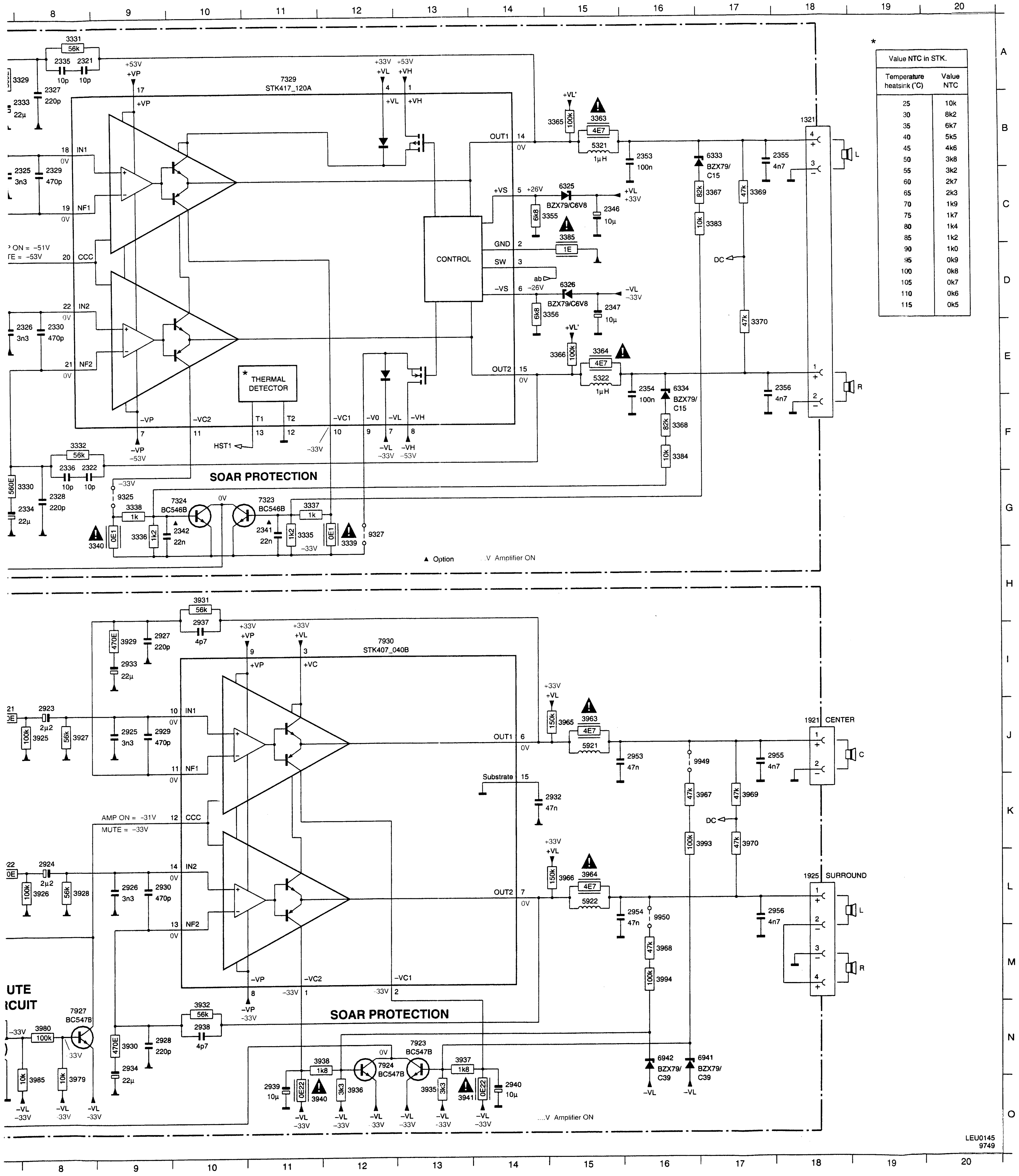
8	B13	3904	G6
9	H13	3905	G6
10	F13	3906	H4
11	A30	3920	F11
14	B13	5902	J3
27	L12	5902	B3
1241	L31	5903	L3
1258	L13	5904	F2
1261	F30	5905	D5
1262	I30	5905	K7
1263	M30	6251	C15
1265	L30	6252	I14
1268	C30	6253	K23
1901	J2	6255	C17
1901	B2	6260	I15
1902	C7	6261	J15
1905	K4	6262	I16
1906	B8	6263	J16
1907	C8	6264	I19
1909	C9	6281	L15
1910	J9	6284	E19
1910	B9	6289	F18
1911	B12	6290	F18
1912	F12	6292	L23
1913	H12	6293	O15
1914	B12	6294	I14
1920	B11	6295	K15
1921	B11	6298	E25
1922	C11	6299	F25
1923	D11	6300	K23
1924	I11	6301	J29
1925	I11	6302	J27
2251	C15	6901	F4
2252	C15	6901	M4
2253	C16	6902	G4
2254	C17	6902	N4
2255	C17	6903	M5
2256	C18	6903	F5
2257	D19	6904	N5
2258	C19	6904	G5
2259	E19	6905	N5
2261	B19	6905	F3
2263	I15	6906	L5
2264	I16	6906	F4
2265	I17	6908	H6
2267	I17	6909	F7
2268	I18	6910	H7
2269	J18	6911	M7
2270	L16	6911	F7
2271	I19	6912	M7
2279	L14	6912	F8
2280	I14	7251	I17
2282	L15	7252	J18
2289	O14	7253	L19
2290	K26	7255	L17
2291	K24	7260	M19
2292	L25	7263	M17
2300	F24	7265	I28
2301	F26	7266	E24
2303	J28	7268	F23
2902	F4	7280	O14
2902	M4	7281	K14
2903	G5	7282	E18
2903	M5	7286	E18
2904	G5	7290	K25
2905	H5	7291	K25
3251	I18	7293	M22
3252	J18	7294	L21
3254	E24	7297	L23
3255	J17	7901	F6
3259	L18	7902	H6
3260	J15	8328	O30
3261	J19	8901	J9
3262	J18	8901	B9
3264	L18	8902	C9
3265	F24	9252	D17
3266	F23	9253	I18
3267	M29	9254	E17
3268	M27	9255	K22
3269	L18	9256	K14
3270	J17	9261	N14
3271	L24	9901	K3
3272	E15	9902	J3
3273	L22	9903	C4
3275	K22	9904	K7
3276	L22	9905	K8
3277	M22	9907	N2
3278	E15	9908	M3
3280	N14	9909	M3
3281	N15	9910	M5
3282	E17	9915	D8
3285	F17	9916	B7
3286	F18	9916	J7
3287	F19	9917	B8
3288	F20	9917	J8
3289	F20	9920	B10
3291	K23	9920	K10
3292	M23	9921	J10
3293	L24	9921	B10
3294	K24	9922	C10
3295	K25	9923	D10
3296	L25	9924	D10
3297	L25	9925	E10
3298	K26	9930	G11
3299	K27		
3300	K26		
3302	E24		
3304	J29		
3305	I28		
3306	L19		
3307	N20		
3309	F24		
3312	K19		
3313	M18		
3315	N20		
3316	M20		
3901	K5		
3902	N6		
3902	E3		
3903	L6		
3903	E4		


LEFT & RIGHT AMPLIFIER (2x 130W)
CENTER & SURROUND AMPLIFIER (50W + 50W)
7329
STK417_120A
7930
STK407_040B
CONTROL
THERMAL DETECTOR
MUTE CIRCUIT
SOAR PROTECTION
From 11 POWER SUPPLY (2x 130W + C/S)
From 1261 POWER SUPPLY (2x 130W + C/S)
From 1268 POWER SUPPLY (2x 130W + C/S)
1325
1326
1324
0022
1922
1928
1321
1921 CENTER
1925 SURROUND
AMP ON = -52V
AMP OFF (MUTE) = 4.7V
AMP ON = -51V
MUTE = -53V
AMP ON = -31V
MUTE = -33V
▲ Option
.....V Amplifier ON
OUT1
OUT2
IN1
IN2
NF1
NF2
CCC
Substrate
L
R
C
LEU0145
9749

LEFT & RIGHT & CENTER & SURROUND AMPLIFIER
3104 217 05470/05490 bl. 130 - 01 (version 3104 219 03260)

*

Value NTC in STK.	
Temperature heatsink (°C)	Value NTC
25	10k
30	8k2
35	6k7
40	5k5
45	4k6
50	3k8
55	3k2
60	2k7
65	2k3
70	1k9
75	1k7
80	1k4
85	1k2
90	1k0
95	0k9
100	0k8
105	0k7
110	0k6
115	0k5


7329
STK417_120A
IN1
NF1
IN2
NF2
CCC
CONTROL
GND
SW
+VS
-VS
OUT1
OUT2
* THERMAL DETECTOR
T1
T2
HST1
-VP
-VC2
-VC1
-V0
-VL
-VH
+VP
+VL
+VH
+53V
+33V
-53V
-33V
AMP ON = -51V
MUTE = -53V
SOAR PROTECTION
7324 BC546B
7323 BC546B
9325
9327
▲ Option
..V Amplifier ON
3331 56k
3332 56k
2335 10p
2321 10p
2336 10p
2322 10p
2327 220p
2328 220p
2333 22µ
2334 22µ
2329 470p
2330 470p
2325 3n3
2326 3n3
3329
3330 560E
3338 1k
3337 1k
3336 1k2
3335 1k2
3340 0E1
3339 0E1
2342 22n
2341 22n
3363 4E7
3364 4E7
3365 100k
3366 100k
5321 1µH
5322 1µH
2353 100n
2354 100n
6325 BZX79/C6V8
6326 BZX79/C6V8
3355 6k8
3356 6k8
3385 1E
2346 10µ
2347 10µ
6333 BZX79/C15
6334 BZX79/C15
3367 82k
3368 82k
3383 10k
3384 10k
3369 47k
3370 47k
2355 4n7
2356 4n7
DC
1321
L
R
+VL'
+26V
-26V
ab
7930
STK407_040B
Substrate
AMP ON = -31V
MUTE = -33V
3931 56k
2937 4p7
3932 56k
2938 4p7
3929 470E
3930 470E
2927 220p
2928 220p
2933 22µ
2934 22µ
2923 2µ2
2924 2µ2
3925 100k
3926 100k
3927 56k
3928 56k
2925 3n3
2926 3n3
2929 470p
2930 470p
2932 47n
3965 150k
3966 150k
3963 4E7
3964 4E7
5921
5922
2953 47n
2954 47n
9949
9950
3967 47k
3968 47k
3993 100k
3994 100k
3969 47k
3970 47k
2955 4n7
2956 4n7
6942 BZX79/C39
6941 BZX79/C39
1921 CENTER
1925 SURROUND
C
7923 BC547B
7924 BC547B
3938 1k8
3937 1k8
3936 3k3
3935 3k3
3940 0E22
3941 0E22
2939 10µ
2940 10µ
7927 BC547B
3980 100k
3985 10k
3979 10k
UTE
RCUIT
....V Amplifier ON
LEU0145
9749

*

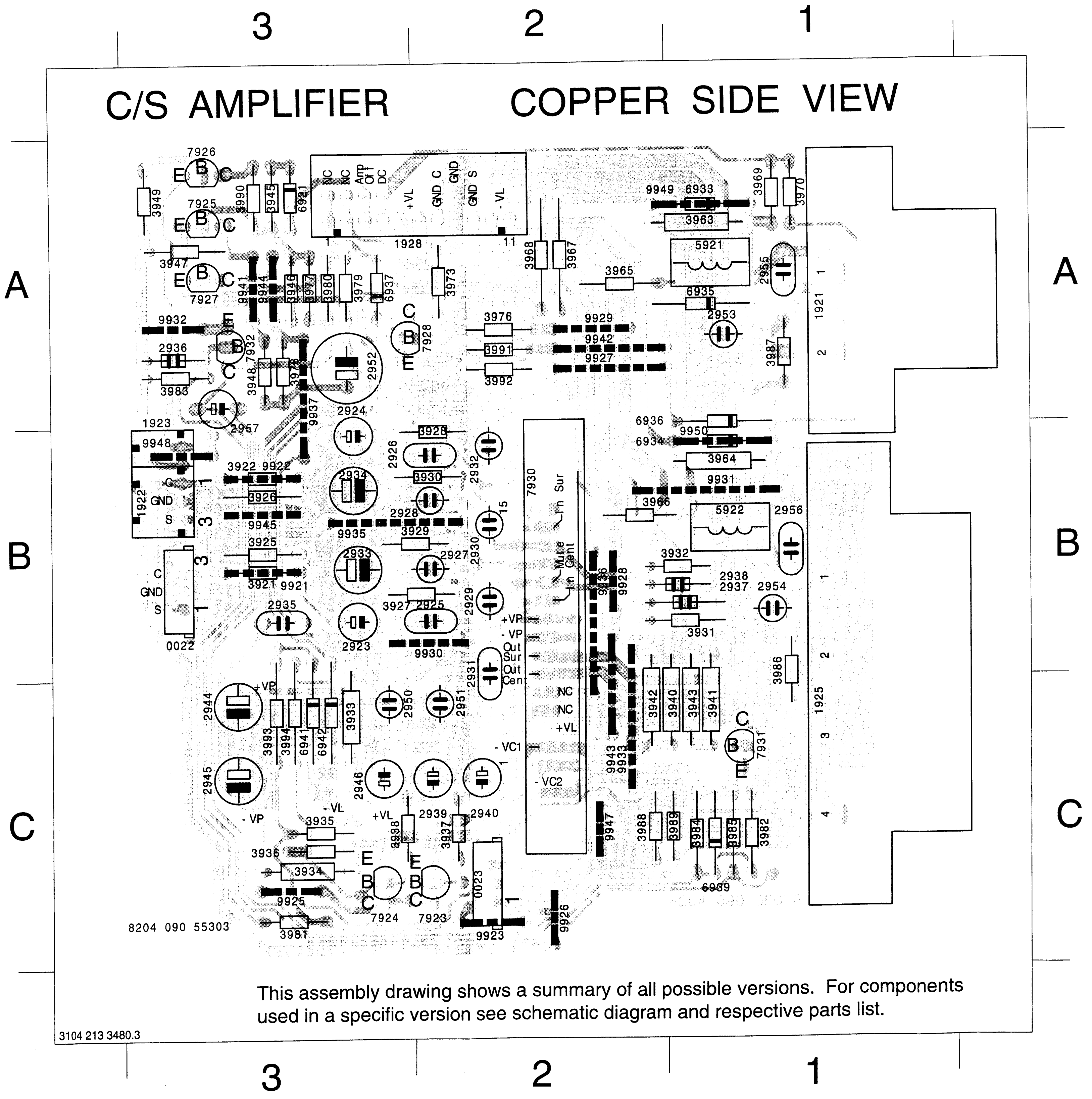
Value NTC in STK.	
Temperature heatsink (°C)	Value NTC
25	10k
30	8k2
35	6k7
40	5k5
45	4k6
50	3k8
55	3k2
60	2k7
65	2k3
70	1k9
75	1k7
80	1k4
85	1k2
90	1k0
95	0k9
100	0k8
105	0k7
110	0k6
115	0k5

3	A2	3927	J8
0022	H2	3928	L8
1321	B18	3929	I9
1324	F3	3930	N9
1325	D2	3931	H10
1326	F2	3932	N10
1921	J18	3933	M2
1922	J2	3934	N2
1925	L18	3935	O13
1928	K2	3936	O12
2321	A8	3937	N13
2322	F8	3938	N11
2323	B6	3940	O11
2324	D6	3941	O13
2325	B7	3945	M4
2326	E7	3946	M5
2327	A8	3947	M6
2328	G8	3948	L6
2329	B8	3963	J15
2330	E8	3964	L15
2331	F2	3965	J15
2333	B7	3966	L15
2334	G7	3967	K16
2335	A8	3968	M16
2336	F8	3969	K17
2341	G11	3970	K17
2342	G10	3977	M5
2343	F4	3978	L7
2344	B3	3979	O8
2345	C3	3980	N8
2346	C15	3981	N6
2347	D15	3982	N5
2348	B2	3983	O6
2349	C2	3984	O5
2350	B3	3985	O8
2351	C3	3993	K16
2352	F6	3994	M16
2353	B16	5321	B15
2354	E16	5322	E15
2355	B18	5921	J15
2356	E18	5922	L15
2359	G2	6325	C15
2361	F2	6326	D15
2365	G6	6333	B17
2923	J8	6334	E16
2924	L8	6337	G4
2925	J9	6339	G5
2926	L9	6360	A3
2927	I9	6921	M4
2928	N9	6939	N5
2929	J9	6941	N16
2930	L9	6942	N16
2931	J2	7323	G11
2932	K14	7324	G10
2933	I9	7325	E5
2934	N9	7326	F7
2936	N7	7327	F5
2937	H10	7329	A11
2938	N10	7350	G6
2939	O11	7923	N13
2940	O14	7924	N12
2944	N3	7925	L6
2945	O3	7927	N8
2946	N2	7930	I12
2950	N3	7931	N6
2951	O3	7932	N7
2952	M7	9325	G9
2953	J16	9327	G12
2954	L16	9949	J16
2955	J17	9950	L16
2956	L17		
2957	N5		
3321	B6		
3322	D6		
3323	F6		
3324	G7		
3325	C6		
3326	E6		
3327	C7		
3328	E7		
3329	A7		
3330	G7		
3331	A8		
3332	F8		
3333	B2		
3334	C2		
3335	G11		
3336	G9		
3337	G11		
3338	G9		
3339	G12		
3340	G8		
3345	E3		
3346	F4		
3347	F5		
3348	E5		
3350	G5		
3351	G4		
3352	G4		
3353	G5		
3355	C14		
3356	D14		
3357	F4		
3358	E6		
3363	B15		
3364	E15		
3365	B15		
3366	E15		
3367	C17		
3368	F16		
3369	C17		
3370	E17		
3377	F2		
3379	G3		
3383	C17		
3384	F16		
3385	C15		
3921	J7		
3922	L7		
3925	J8		
3926	L8		

CENTER / SURROUND AMPLIFIER BOARD LAYOUT

9925	C	3
9926	C	2
9927	A	2
9928	B	2
9929	A	2
9930	B	2
9931	B	1
9932	A	3
9933	C	2
9935	B	3
9936	B	2
9937	A	3
9941	A	3
9942	A	2
9943	C	2
9944	A	3
9945	B	3
9947	C	2
9948	B	3
9949	A	1
9950	B	1

3945	A	3
3946	A	3
3947	A	3
3948	A	3
3949	A	3
3963	A	1
3964	B	1
3965	A	2
3966	B	2
3967	A	2
3968	A	2
3969	A	1
3970	A	1
3973	A	2
3976	A	2
3977	A	3
3978	A	3
3979	A	3
3980	A	3
3981	C	3
3982	C	1
3983	A	3
3984	C	1
3985	C	1
3986	B	1
3987	A	1
3988	C	2
3989	C	1
3990	A	3
3991	A	2
3992	A	2
3993	C	3
3994	C	3
5921	A	1
5922	B	1
6921	A	3
6933	A	1
6934	B	1
6935	A	1
6936	A	1
6937	A	3
6939	C	1
6941	C	3
6942	C	3
7923	C	2
7924	C	3
7925	A	3
7926	A	3
7927	A	3
7928	A	3
7930	C	2
7931	C	1
7932	A	3
9921	B	3
9922	B	3
9923	C	2
0022	B	3
0023	C	2
1921	A	1
1922	B	3
1923	B	3
1925	C	1
1928	A	2
2923	B	3
2924	B	3
2925	B	2
2926	B	2
2927	B	2
2928	B	2
2929	B	2
2930	B	2
2931	B	2
2932	B	2
2933	B	3
2934	B	3
2935	B	3
2936	A	3
2937	B	1
2938	B	1
2939	C	2
2940	C	2
2944	C	3
2945	C	3
2946	C	3
2950	C	3
2951	C	2
2952	A	3
2953	A	1
2954	B	1
2955	A	1
2956	B	1
2957	A	3
3921	B	3
3922	B	3
3925	B	3
3926	B	3
3927	B	2
3928	B	2
3929	B	2
3930	B	2
3931	B	1
3932	B	1
3933	C	3
3934	C	3
3935	C	3
3936	C	3
3937	C	2
3938	C	3
3940	C	1
3941	C	1
3942	C	2
3943	C	1


3
2
1
A
B
C
C/S AMPLIFIER
COPPER SIDE VIEW
1928
1921
1922
1923
1925
0022
0023
7930
NC
Amp
Off
DC
+VL
GND C
GND
GND S
- VL
+VP
- VP
Out Sur
Out Cen
Mute
In Sur
In Cent
- VC1
- VC2
8204 090 55303
3104 213 3480.3

This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

ELECTRICAL PARTS LIST - MAINS BOARD

MISCELLANEOUS

27	4822 265 30734	⚠	Connector 4 pin
1901	4822 265 31015	⚠	Mains Socket
1901#	4822 265 31016	⚠	Mains Socket
1902*	4822 272 10269	⚠	Voltage selector
1905^	4822 071 55002	⚠	Fuse T5A 250V
1905#	4822 252 51123	⚠	Fuse T6,3A 250V
1906*	4822 071 55002	⚠	Fuse T5A 250V
1907*	4822 071 55002	⚠	Fuse T5A 250V
1909*	4822 267 10728	⚠	Primary Connector 4 pin
1910	4822 265 20723	⚠	Primary Connector 2 pin
1911	4822 267 10734		Secondary Connector 5 pin
1912	4822 267 10565		Secondary Connector 4 pin
1913	4822 267 10735		Secondary Connector 3 pin
1914	4822 267 10734		Secondary Connector 5 pin
1920	4822 071 55002	⚠	Fuse T5A 250V
1921	4822 071 55002	⚠	Fuse T5A 250V
1922	4822 071 55002	⚠	Fuse T5A 250V
1923	4822 071 55002	⚠	Fuse T5A 250V
1924	4822 071 52502	⚠	Fuse T2,5A 250V
1925	4822 071 51602	⚠	Fuse T1,6A 250V

CAPACITORS

2902	4822 121 43526	47nF 5% 250V
2903	4822 121 43526	47nF 5% 250V
2904*	4822 124 40255	100µF 20% 63V
2905*	4822 124 81029	100µF 20% 25V

RESISTORS

3901#	4822 053 21106	⚠	10M 5% 0,5W
3902	4822 050 11002		1k 1% 0,4W
3903	4822 050 11002		1k 1% 0,4W
3904*	4822 116 52283		4k7 5% 0,5W
3905*	4822 116 52283		4k7 5% 0,5W
3906*	4822 116 83864		10k 5% 0,5W
3920*	4822 052 10108	⚠	1R 5% 0,33W

COILS & RELAYS

5902	4822 157 10417	⚠	Mains Choke 6A /21
5903^	4822 146 10437	⚠	Standby Transformer
5904*	4822 146 10466	⚠	Standby Transformer
5905	4822 280 10299	⚠	Relay 1P 9V 15A

DIODES

6901	4822 130 31878	1N4003G
6902	4822 130 31878	1N4003G
6903	4822 130 31878	1N4003G
6904	4822 130 31878	1N4003G
6905	4822 130 30621	1N4148
6906	4822 130 30621	1N4148
6908*	4822 130 34382	BZX79-B8V2
6909*	4822 130 31878	1N4003G
6910*	4822 130 31878	1N4003G
6911	4822 130 30621	1N4148
6912	4822 130 30621	1N4148

TRANSISTORS & INTEGRATED CIRCUITS

7901*	4822 130 41246	BC327-25
7902*	4822 130 40959	BC547B

* For /21/21M only
^ Except for /21/21M
# For /37 only

Note: Only the parts mentioned in this list are normal service spare parts.

ELECTRICAL PARTS LIST - PS & L/R AMP. BOARD

MISCELLANEOUS

1258	4822 267 10567	Connector 4 pin
1261	4822 267 10745	Connector 8 pin Vert
1263	4822 267 10573	Connector 8 pin
1268	4822 267 10746	Connector 11 pin
1321	4822 267 31176	Loudspeaker Socket L/R
1324	4822 265 10913	Cinch Socket
1325	4822 267 10747	Connector 8 pin
1326	4822 267 10748	Connector 3 pin

CAPACITORS

2251	5322 121 42578	100nF 5% 250V
2252	5322 121 42578	100nF 5% 250V
2253	5322 121 42578	100nF 5% 250V
2254	4822 121 43526	47nF 5% 250V
2255	4822 121 43526	47nF 5% 250V
2256	4822 121 43526	47nF 5% 250V
2257	4822 124 12132	6800µF 20% 63V
2258	4822 124 12132	6800µF 20% 63V
2259	4822 124 11504	50V 6800µF 20%
2261	4822 124 11504	50V 6800µF 20%
2263	5322 121 42386	100nF 5% 63V
2264	5322 121 42386	100nF 5% 63V
2265	4822 124 80563	4700µF 20% 35V
2267	4822 124 40255	100µF 20% 63V
2268	4822 124 22263	220µF 20% 25V
2269	4822 122 33197	1nF 10% 50V
2270	4822 124 41579	10µF 20% 50V
2271	4822 124 40433	47µF 20% 25V
2279	5322 121 42386	100nF 5% 63V
2280	4822 124 11581	6800µF 20% 25V
2282	4822 124 41579	10µF 20% 50V
2289	4822 124 40242	1µF 20% 63V
2290	4822 124 81029	100µF 20% 25V
2291	4822 124 81151	22µF 50V
2292	4822 122 33195	100pF 10% 50V
2300	4822 121 51387	10nF 20% 16V
2301	4822 124 41584	100µF 20% 10V
2303	4822 121 41857	10nF 5% 250V
2321	4822 122 33847	10pF 5% 50V
2322	4822 122 33847	10pF 5% 50V
2323	4822 124 41576	2,2µF 20% 50V
2324	4822 124 41576	2,2µF 20% 50V
2325	4822 122 33532	3,3nF 5% 50V
2326	4822 122 33532	3,3nF 5% 50V
2327	5322 122 32334	220pF 10% 100V
2328	5322 122 32334	220pF 10% 100V
2329	5322 122 32311	470pF 10% 100V
2330	5322 122 32311	470pF 10% 100V
2331	5322 122 32261	4,7nF 10% 100V
2333	4822 124 81151	22µF 50V
2334	4822 124 81151	22µF 50V
2335	4822 122 33847	10pF 5% 50V
2336	4822 122 33847	10pF 5% 50V
2341	4822 126 11585	22nF +80/-20% 25V
2342	4822 126 11585	22nF +80/-20% 25V
2343	4822 124 41579	10µF 20% 50V
2344	4822 124 80068	22µF 20% 100V
2345	4822 124 80068	22µF 20% 100V
2346	4822 124 41579	10µF 20% 50V
2347	4822 124 41579	10µF 20% 50V
2348	4822 124 81043	10µF 20% 100V
2349	4822 124 81043	10µF 20% 100V
2350	5322 121 42386	100nF 5% 63V
2351	5322 121 42386	100nF 5% 63V
2352	4822 124 80556	1000µF 20% 10V
2353	5322 121 42386	100nF 5% 63V
2354	5322 121 42386	100nF 5% 63V
2355	5322 122 32261	4,7nF 10% 100V
2356	5322 122 32261	4,7nF 10% 100V
2359	4822 122 33195	100pF 10% 50V
2361	4822 124 40242	1µF 20% 63V
2365	4822 126 11585	22nF +80/-20% 25V

RESISTORS

3251	4822 116 52256		2k2 5% 0,5W
3252	4822 116 52256		2k2 5% 0,5W
3254	4822 116 52228		680R 5% 0,5W
3255	4822 116 83883		470R 5% 0,5W
3259	4822 116 83864		10k 5% 0,5W
3260	4822 117 11342		0R33 5% 2W
3261	4822 116 83876		270R 5% 0,5W
3262	4822 116 52206		120R 5% 0,5W
3264	4822 116 83864		10k 5% 0,5W
3265	4822 116 52234		100k 5% 0,5W
3266	4822 116 52228		680R 5% 0,5W
3267	4822 116 52276		3k9 5% 0,5W
3268	4822 116 83864		10k 5% 0,5W
3269	4822 116 83864		10k 5% 0,5W
3270	4822 117 11342		0R33 5% 2W
3271	4822 116 52234		100k 5% 0,5W
3272	4822 116 52269		3k3 5% 0,5W
3273	4822 116 52283		4k7 5% 0,5W
3275	4822 116 52283		4k7 5% 0,5W
3276	4822 116 83961		6k8 5%
3277	4822 116 52283		4k7 5% 0,5W
3278	4822 116 52256		2k2 5% 0,5W
3280	4822 116 52239		120k 5% 0,5W
3281	4822 116 83864		10k 5% 0,5W
3282	4822 052 10479	⚠	47R 5% 0,33W
3285	4822 116 52269		3k3 5% 0,5W
3286	4822 116 52269		3k3 5% 0,5W
3287	4822 116 52257		22k 5% 0,5W
3288	4822 052 10479	⚠	47R 5% 0,33W
3289	4822 052 10479	⚠	47R 5% 0,33W

ELECTRICAL PARTS LIST - PS & L/R AMP. BOARD

7253	4822 130 44568	BC557B
7255	4822 130 40959	BC547B
7260	4822 130 40959	BC547B
7263	4822 130 40959	BC547B
7265	4822 130 41691	BC556B
7266	4822 130 44568	BC557B
7268	4822 130 40959	BC547B
7280	4822 130 40959	BC547B
7281	4822 209 31841	L7805CP
7282	4822 130 41246	BC327-25
7286	4822 130 41246	BC327-25
7290	4822 130 41246	BC327-25
7291	4822 130 40959	BC547B
7293	4822 130 40959	BC547B
7294	4822 130 44568	BC557B
7297	4822 130 40959	BC547B
7323	4822 130 44461	BC546B
7324	4822 130 44461	BC546B
7325	4822 130 40959	BC547B
7326	4822 130 40959	BC547B
7327	4822 130 44461	BC546B
7329	4822 209 16165	STK417-120A
7350	4822 130 41691	BC556B

Note: Only the parts mentioned in this list are normal service spare parts.

ELECTRICAL PARTS LIST - PS & L/R AMP. BOARD

RESISTORS

3291	4822 116 52263		2k7 5% 0,5W
3292	4822 116 83872		220R 5% 0,5W
3293	4822 116 52207		1k2 5% 0,5W
3294	4822 116 52243		1k5 5% 0,5W
3295	4822 116 83864		10k 5% 0,5W
3296	4822 116 52283		4k7 5% 0,5W
3297	4822 116 52256		2k2 5% 0,5W
3298	4822 116 52219		330R 5% 0,5W
3299	4822 116 52219		330R 5% 0,5W
3300	4822 052 10478	⚠	4R7 5% 0,33W
3302	4822 116 83884		47k 5% 0,5W
3304	4822 116 83884		47k 5% 0,5W
3305	4822 116 52257		22k 5% 0,5W
3306	4822 116 52257		22k 5% 0,5W
3307	4822 116 52256		2k2 5% 0,5W
3309	4822 116 52271		33k 5% 0,5W
3312	4822 116 83864		10k 5% 0,5W
3313	4822 050 11002		1k 1% 0,4W
3315	4822 116 83884		47k 5% 0,5W
3316	4822 116 83884		47k 5% 0,5W
3321	4822 116 83864		10k 5% 0,5W
3322	4822 116 83864		10k 5% 0,5W
3323	4822 116 52234		100k 5% 0,5W
3324	4822 116 83864		10k 5% 0,5W
3325	4822 050 11002		1k 1% 0,4W
3326	4822 050 11002		1k 1% 0,4W
3327	4822 116 52291		56k 5% 0,5W
3328	4822 116 52291		56k 5% 0,5W
3329	4822 116 52226		560R 5% 0,5W
3330	4822 116 52226		560R 5% 0,5W
3331	4822 116 52291		56k 5% 0,5W
3332	4822 116 52291		56k 5% 0,5W
3333	4822 052 10479	⚠	47R 5% 0,33W
3334	4822 052 10479	⚠	47R 5% 0,33W
3335	4822 116 52207		1k2 5% 0,5W
3336	4822 116 52207		1k2 5% 0,5W
3337	4822 050 11002		1k 1% 0,4W
3338	4822 050 11002		1k 1% 0,4W
3339	4822 113 80633	⚠	0R1 5% 3W
3340	4822 113 80633	⚠	0R1 5% 3W
3345	4822 116 52234		100k 5% 0,5W
3346	4822 116 83864		10k 5% 0,5W
3347	4822 116 52271		33k 5% 0,5W
3348	4822 116 83872		220R 5% 0,5W
3350	4822 050 11002		1k 1% 0,4W
3351	4822 116 52234		100k 5% 0,5W
3352	4822 116 52234		100k 5% 0,5W
3353	4822 116 52257		22k 5% 0,5W
3355	4822 116 83961		6k8 5%
3356	4822 116 83961		6k8 5%
3357	4822 116 52234		100k 5% 0,5W
3358	4822 050 11002		1k 1% 0,4W
3363	4822 053 10478	⚠	4R7 5% 1W
3364	4822 053 10478	⚠	4R7 5% 1W
3365	4822 116 52234		100k 5% 0,5W
3366	4822 116 52234		100k 5% 0,5W
3367	4822 116 52304		82k 5% 0,5W
3368	4822 116 52304		82k 5% 0,5W
3369	4822 116 83884		47k 5% 0,5W
3370	4822 116 83884		47k 5% 0,5W
3377	4822 050 11002		1k 1% 0,4W
3379	4822 116 52234		100k 5% 0,5W
3383	4822 116 83864		10k 5% 0,5W
3384	4822 116 83864		10k 5% 0,5W
3385	4822 052 10108	⚠	1R 5% 0,33W

COILS

5321	4822 157 70599	Ind. Fxd Bead EMI
5322	4822 157 70599	Ind. Fxd Bead EMI

DIODES

6251	4822 130 11139		GBU8D
6252	5322 130 80686		1N5392
6253	4822 130 34382		BZX79-B8V2
6255	4822 130 11139	⚠	GBU8D
6260	5322 130 80686		1N5392
6261	5322 130 80686		1N5392
6262	5322 130 80686		1N5392
6263	5322 130 80686		1N5392
6264	4822 130 61219		BZX79-F10
6281	4822 130 31878		1N4003GP
6284	4822 130 34173		BZX79-C5V6
6289	4822 130 34281		BZX79/C15
6290	4822 130 34281		BZX79/C15
6292	4822 130 30621		1N4148
6293	4822 130 34382		BZX79-C8V2
6294	5322 130 80686		1N5392
6295	4822 130 30621		1N4148
6298	4822 130 34278		BZX79-C6V8
6299	4822 130 30621		1N4148
6300	4822 130 30621		1N4148
6301	4822 130 30621		1N4148
6302	5322 130 31504		BZX79-C3V3
6325	4822 130 34278		BZX79-C6V8
6326	4822 130 34278		BZX79-C6V8
6333	4822 130 34281		BZX79-C15
6334	4822 130 34281		BZX79-C15
6337	4822 130 30621		1N4148
6339	4822 130 30621		1N4148
6360	4822 130 34281		BZX79-C15

TRANSISTORS & INTEGRATED CIRCUITS

7251	4822 130 10812	BDX53BFI
7252	4822 130 40959	BC547B

ELECTRICAL PARTS LIST - CENTER/SURROUND AMP. BOARD

MISCELLANEOUS

1921	4822 265 10464	Loudspeaker Socket Cen
1922	4822 267 10748	connector 3 pin
1925	4822 265 10912	Loudspeaker Socket Surr
1928	4822 267 10749	Connector 11 pin

CAPACITORS

2923	4822 124 41576	2,2µF 20% 50V
2924	4822 124 41576	2,2µF 20% 50V
2925	4822 122 33532	3,3nF 5% 50V
2926	4822 122 33532	3,3nF 5% 50V
2927	5322 122 32334	220pF 10% 100V
2928	5322 122 32334	220pF 10% 100V
2929	5322 122 32311	470pF 10% 100V
2930	5322 122 32311	470pF 10% 100V
2931	5322 122 32261	4,7nF 10% 100V
2932	4822 122 33449	47nF 30% 50V
2933	4822 124 81151	22µF 50V
2934	4822 124 81151	22µF 50V
2936	4822 126 12785	47nF TUB 50V
2937	4822 122 10465	4,7pF 10% 50V
2938	4822 122 10465	4,7pF 10% 50V
2939	4822 124 41579	10µF 20% 50V
2940	4822 124 41579	10µF 20% 50V
2944	5322 124 41381	22µF 20% 50V
2945	5322 124 41381	22µF 20% 50V
2946	4822 124 41579	10µF 20% 50V
2950	4822 122 33449	47nF 30% 50V
2951	4822 122 33449	47nF 30% 50V
2952	4822 124 80556	1000µF 20% 10V
2953	4822 122 33449	47nF 30% 50V
2954	4822 122 33449	47nF 30% 50V
2955	5322 122 32261	4,7nF 10% 100V
2956	5322 122 32261	4,7nF 10% 100V
2957	4822 124 41579	10µF 20% 50V

RESISTORS

3921	4822 116 83883		470R 5% 0,5W
3922	4822 116 83883		470R 5% 0,5W
3925	4822 116 52234		100k 5% 0,5W
3926	4822 116 52234		100k 5% 0,5W
3927	4822 116 52291		56k 5% 0,5W
3928	4822 116 52291		56k 5% 0,5W
3929	4822 116 83883		470R 5% 0,5W
3930	4822 116 83883		470R 5% 0,5W
3931	4822 116 52291		56k 5% 0,5W
3932	4822 116 52291		56k 5% 0,5W
3933	4822 052 10479	⚠	47R 5% 0,33W
3934	4822 052 10479	⚠	47R 5% 0,33W
3935	4822 116 52269		3k3 5% 0,5W
3936	4822 116 52269		3k3 5% 0,5W
3937	4822 116 52249		1k8 5% 0,5W
3938	4822 116 52249		1k8 5% 0,5W
3940	4822 117 11744	⚠	0R22 5% 1W
3941	4822 117 11744	⚠	0R22 5% 1W
3945	4822 116 52234		100k 5% 0,5W
3946	4822 116 83864		10k 5% 0,5W
3947	4822 116 52271		33k 5% 0,5W
3948	4822 116 83872		220R 5% 0,5W
3963	4822 053 10478	⚠	4R7 5% 1W
3964	4822 053 10478	⚠	4R7 5% 1W
3965	4822 116 52245		150k 5% 0,5W
3966	4822 116 52245		150k 5% 0,5W
3967	4822 116 83884		47k 5% 0,5W
3968	4822 116 83884		47k 5% 0,5W
3969	4822 116 83884		47k 5% 0,5W
3970	4822 116 83884		47k 5% 0,5W
3977	4822 116 52234		100k 5% 0,5W
3978	4822 050 11002		1k 1% 0,4W
3979	4822 116 83864		10k 5% 0,5W
3980	4822 116 52234		100k 5% 0,5W
3981	4822 116 83864		10k 5% 0,5W
3982	4822 116 52234		100k 5% 0,5W
3983	4822 116 83883		470R 5% 0,5W
3984	4822 116 52234		100k 5% 0,5W
3985	4822 116 83864		10k 5% 0,5W
3993	4822 116 52234		100k 5% 0,5W
3994	4822 116 52234		100k 5% 0,5W

COILS

5921	4822 157 62255	Coil 18,5 Turns
5922	4822 157 62255	Coil 18,5 Turns

DIODES

6921	4822 130 30621	1N4148
6939	4822 130 30621	1N4148
6941	4822 130 34145	BZX79-B39
6942	4822 130 34145	BZX79-B39

TRANSISTORS & INTEGRATED CIRCUITS

7923	4822 130 40959	BC547B
7924	4822 130 40959	BC547B
7925	4822 130 40959	BC547B
7927	4822 130 40959	BC547B
7930	4822 209 16166	STk407-040B
7931	4822 130 40959	BC547B
7932	4822 130 44568	BC557B

Note: Only the parts mentioned in this list are normal service spare parts.

AF5 BOARD

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BRIEF INTRODUCTION OF THE AF5 BOARD

The AF5 Board consists of the following features :

a. SOFAC IC
SOFAC IC TEA6321 (7553) includes functions such as source selection, loudness control, dynamic bass control, treble control, front/rear volume control and muting function. Sound features such as DBB, DSC and IS are controllable via I²C data from the microprocessor.

The SOFAC IC caters for 4 input sources, namely tuner, tape, CD and AUX. It also has a MONO input which is tied to ground via 100n. In our application , software will switch the input source to MONO input during STANDBY and other occasions where noise from other input sources is undesirable.

Note: Input to SOFAC IC must be ac-coupled to prevent 'plop' noise.

b. KARAOKE MIC. MIXING
Karaoke Mic. Mixing can be configured to cater for one of the following :
NK : Non Karaoke.
SK : Simple Karaoke which caters for mic. mixing with additional mic. amplifier board.
FK : Full Karaoke with vocal fader and echo effect with additional karaoke board.

c. DOLBY PRO LOGIC (DPL) INTERFACE
DPL Interface can be configured to cater for DPL and also DPL with one of the karaoke functions.

d. LINE OUT
Line Out with JST XH connector for connection to LINE OUT cinch socket.

e. SUB-WOOFER OUTPUT
Sub-Woofer Output with cinch socket for connection to active sub-woofer speaker.

f. INCREDIBLE SURROUND
Incredible Surround effect using transistor circuit BC847C (7517, 7518, 7519, 7520) to create phase shifting and spatial effect.

g. HEADPHONE AMPLIFIER
Headphone Amplifier using Op-Amp. NJM4556AM (7501).

h. CD STANDBY SWITCH
CD Standby control circuit using transistors BC327-25 (7515) and BC847C (7516) which switches on the supply to CD servo control IC , HF circuit and the laser light pen in CD mode only.

i. HEADPHONE SENSING CIRCUIT
Headphone Sensing circuit to mute centre and surround channels in DPL application.

j. ATTENUATION NETWORK
Attenuation network is provided at the output of the AF5 Board for interfacing with the power board of different output power.

AF5 board application

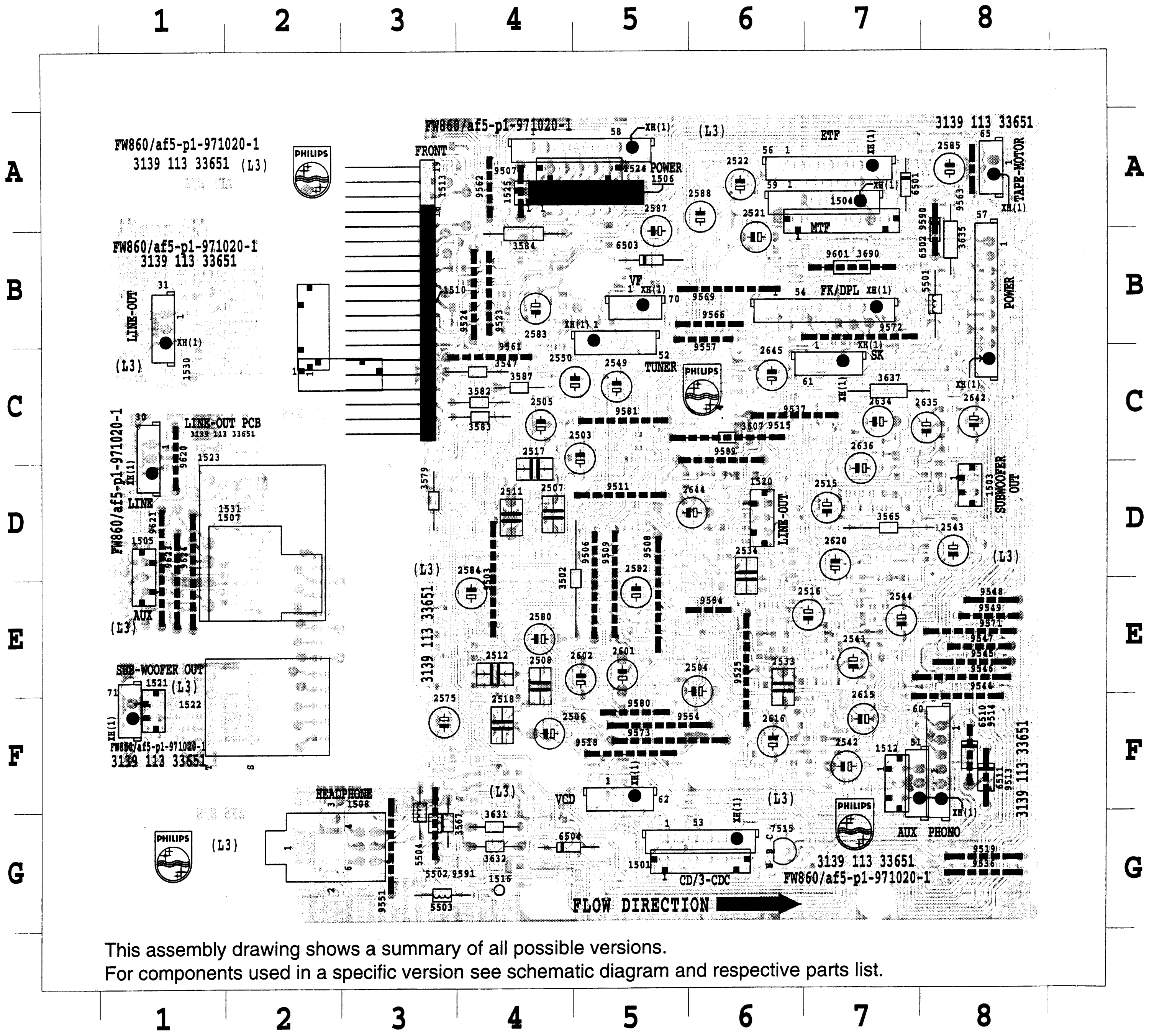
AF5 pcb	Used by:
A87760	FW850C/21/21M, FW855C/21/21M/33
A87780	FW850C/22/34, FW855C/34
A87820	FW860P/21/21M
A87890	FW880P/22/34, FW880W/22/34
A87910	FW880P/21/21M/33, FW880W/21/21M

Variations table for different AF5 boards

Item Nos.	A87760	A87780	A87820	A87890	A87910
30	-	-	x	-	-
31	x	x	-	x	x
54	x	-	x	x	x
1506	-	-	x	-	-
1510	-	-	x	-	-
1513	x	x	-	x	x
1518	-	-	x	x	x
1523	-	-	x	-	-
1525	x	x	-	x	x
1530, 1531	x	x	-	x	x
1576	x	-	-	-	-
2541, 2542	47u	0u47	47u	47u	47u
2615, 2616	4u7	4u7	10u	10u	10u
2644, 2645	0u47	0u47	4u7	4u7	4u7
2648, 2649	-	-	1u	-	-
2650, 2651	-	-	2n2	-	-
2652, 2653	-	-	22n	-	-
2671, 2672	1u	1u	-	1u	1u
2673, 2674	2n2	2n2	-	2n2	2n2
2675, 2676	22n	22n	-	22n	22n
3503, 3504	5k6	5k6	3k9	5k6	5k6
3519, 3520	8k2	-	6k8	6k8	6k8
3577, 3578	4k7	4k7	3k3	4k7	4k7
3597, 3598	-	-	27k	27k	27k
3605, 3606	2k2	2k2	2k2	1k2	2k2
3618, 3619	-	-	1k	-	-
3645, 3646	1k8	-	1k8	1k8	1k8
3674	2k2	2k2	3k3	4k7	4k7
3675	2k2	3k3	2k2	3k3	2k2
3701, 3702	1k	1k	-	1k	1k
4501, 4502	-	x	-	-	-
4574	x	x	-	x	x
4650, 4651	-	-	x	-	x
4652	-	-	x	-	-
9507	-	-	x	-	-
9623, 9624	x	x	-	x	x

x = Item in use

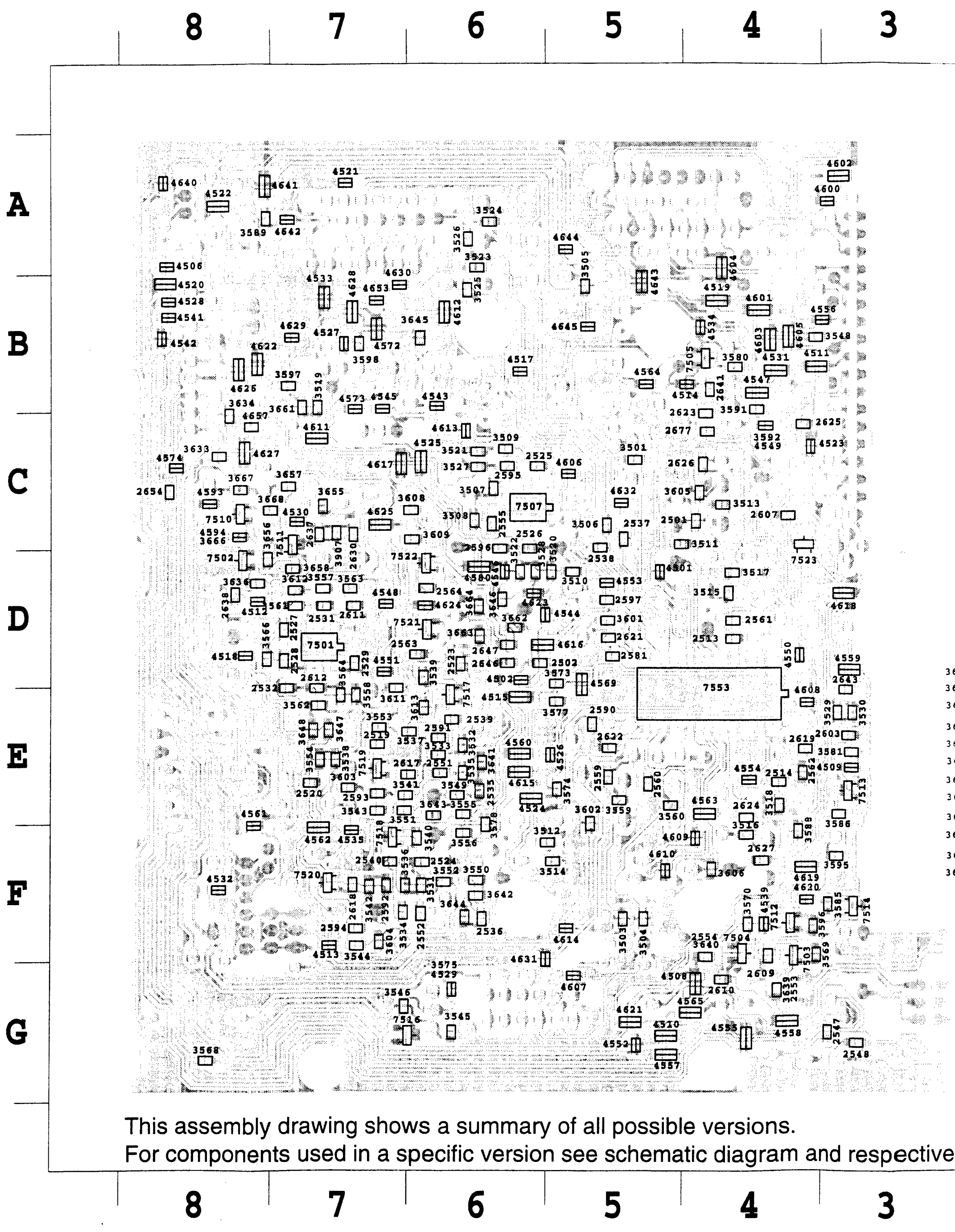
COMPONENT LAYOUT


1
2
3
4
5
6
7
8
A
B
C
D
E
F
G
FW860/af5-p1-971020-1
3139 113 33651 (L3)
LINE-OUT
LINE-OUT PCB
LINE
AUX
SUB-WOOFER OUT
HEADPHONE
FRONT
POWER
TUNER
ETF
MTF
VF
FK/DPL
SK
TAPE-MOTOR
SUBWOOFER OUT
VCD
CD/3-CDC
AUX PHONO
PHILIPS
FLOW DIRECTION

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram and respective parts list.

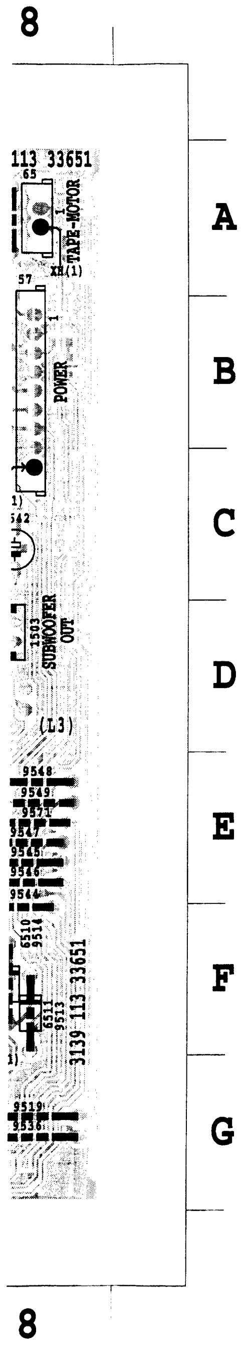
30	C	1	2580	E	4	9536	G	8
31	B	1	2582	E	5	9537	C	6
51	F	7	2583	B	4	9544	F	8
52	B	5	2584	E	4	9545	E	8
53	G	6	2585	A	8	9546	E	8
54	B	7	2587	B	5	9547	E	8
56	A	7	2588	A	6	9548	E	8
57	B	8	2601	E	5	9549	E	8
58	A	5	2602	E	5	9551	G	3
59	A	7	2615	F	7	9554	F	5
60	F	8	2616	F	6	9557	B	6
61	C	7	2620	D	7	9561	C	4
62	F	5	2634	C	7	9562	A	4
65	A	8	2635	C	8	9563	A	8
70	B	5	2636	D	7	9566	B	6
71	F	1	2642	C	8	9569	B	6
1501	G	6	2644	D	6	9571	E	8
1503	D	8	2645	C	6	9572	B	7
1504	A	7	3502	E	5	9573	F	5
1505	D	1	3547	C	4	9580	F	5
1506	A	5	3565	D	7	9581	C	5
1507	E	2	3567	G	3	9584	E	6
1508	G	2	3579	D	3	9589	C	6
1510	B	3	3582	C	4	9590	B	8
1512	F	7	3583	C	4	9591	G	3
1513	B	3	3584	B	4	9601	B	7
1516	G	4	3587	C	4	9620	C	1
1520	D	6	3607	C	6	9621	D	1
1521	F	1	3631	G	4	9623	E	1
1522	F	2	3632	G	4	9624	D	1
1523	D	2	3635	B	8			
1524	A	5	3637	C	7			
1525	A	5	3690	B	7			
1530	B	2	5501	B	8			
1531	C	2	5502	G	3			
2503	C	5	5503	G	3			
2504	E	6	5504	G	3			
2505	C	4	6501	A	7			
2506	F	4	6502	B	8			
2507	D	4	6503	B	5			
2508	E	4	6504	G	4			
2511	D	4	6510	F	8			
2512	E	4	6511	F	8			
2515	D	7	7515	G	6			
2516	E	7	9503	E	4			
2517	D	4	9506	E	5			
2518	F	4	9507	A	4			
2521	B	6	9508	E	5			
2522	A	6	9509	E	5			
2533	E	6	9511	D	5			
2534	D	6	9513	F	8			
2541	E	7	9514	F	8			
2542	F	7	9515	C	6			
2543	D	8	9518	F	5			
2544	E	7	9519	G	8			
2549	C	5	9523	B	4			
2550	C	5	9524	B	4			
2575	F	3	9525	E	6			

CHIP LAYOUT

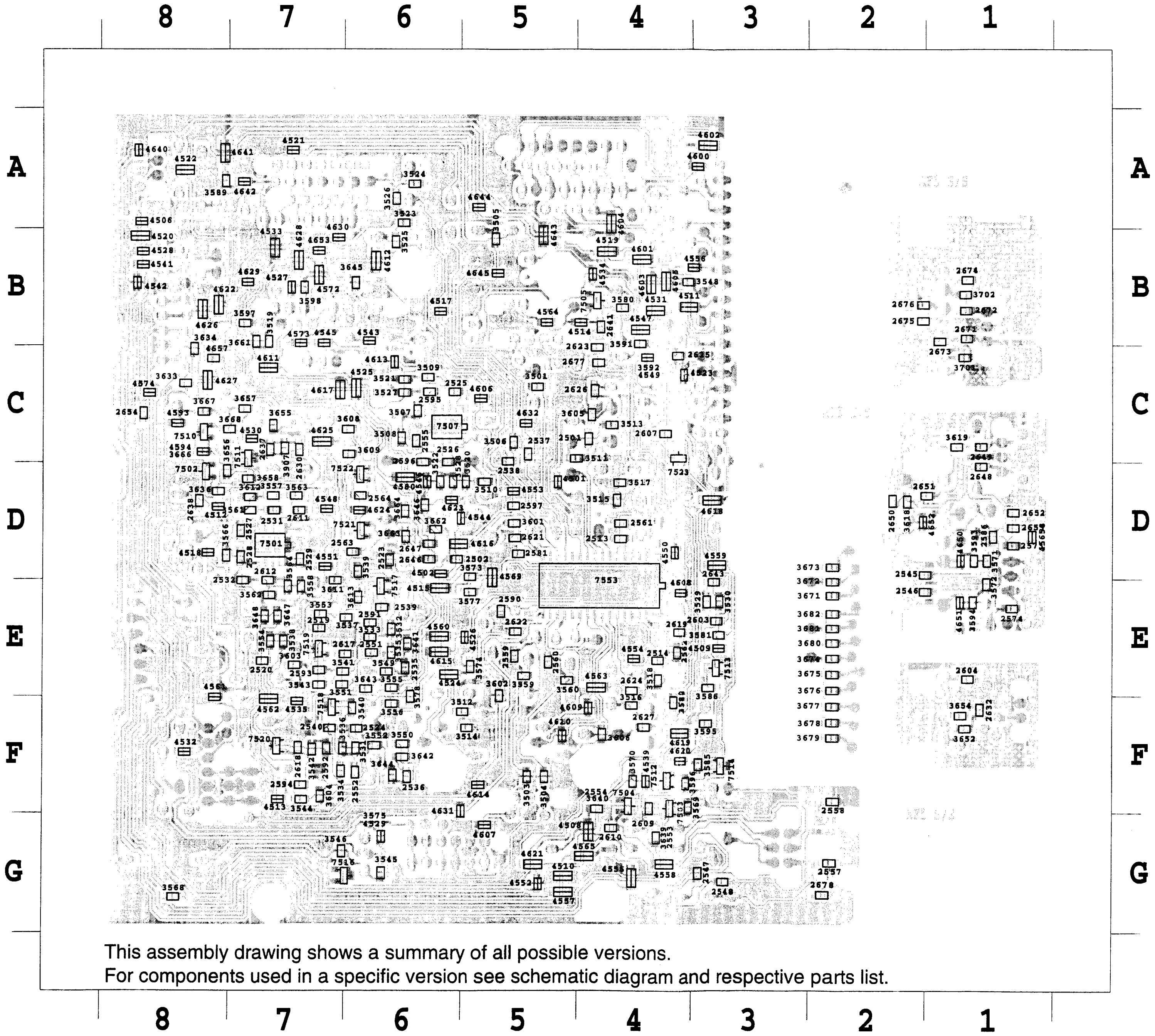

8
7
6
5
4
3
A
B
C
D
E
F
G
7501
7507
7553

This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram and respective

CHIP LAYOUT



30	C	1
31	B	1
51	F	7
52	B	5
53	G	6
54	B	7
56	A	7
57	B	8
58	A	5
59	A	7
60	F	8
61	C	7
62	F	5
65	A	8
70	B	5
71	F	1
1501	G	6
1503	D	8
1504	A	7
1505	D	1
1506	A	5
1507	E	2
1508	G	2
1510	B	3
1512	F	7
1513	B	3
1516	G	4
1520	D	6
1521	F	1
1522	F	2
1523	D	2
1524	A	5
1525	A	5
1530	B	2
1531	C	2
2503	C	5
2504	E	6
2505	C	4
2506	F	4
2507	D	4
2508	E	4
2511	D	4
2512	E	4
2515	D	7
2516	E	7
2517	D	4
2518	F	4
2521	B	6
2522	A	6
2533	E	6
2534	D	6
2541	E	7
2542	F	7
2543	D	8
2544	E	7
2549	C	5
2550	C	5
2575	F	3
2580	E	4
2582	E	5
2583	B	4
2584	E	4
2585	A	8
2587	B	5
2588	A	6
2601	E	5
2602	E	5
2615	F	7
2616	F	6
2620	D	7
2634	C	7
2635	C	8
2636	D	7
2642	C	8
2644	D	6
2645	C	6
3502	E	5
3547	C	4
3565	D	7
3567	G	3
3579	D	3
3582	C	4
3583	C	4
3584	B	4
3587	C	4
3607	C	6
3631	G	4
3632	G	4
3635	B	8
3637	C	7
3690	B	7
5501	B	8
5502	G	3
5503	G	3
5504	G	3
6501	A	7
6502	B	8
6503	B	5
6504	G	4
6510	F	8
6511	F	8
7515	G	6
9503	E	4
9506	E	5
9507	A	4
9508	E	5
9509	E	5
9511	D	5
9513	F	8
9514	F	8
9515	C	6
9518	F	5
9519	G	8
9523	B	4
9524	B	4
9525	E	6
9536	G	8
9537	C	6
9544	F	8
9545	E	8
9546	E	8
9547	E	8
9548	E	8
9549	E	8
9551	G	3
9554	F	5
9557	B	6
9561	C	4
9562	A	4
9563	A	8
9566	B	6
9569	B	6
9571	E	8
9572	B	7
9573	F	5
9580	F	5
9581	C	5
9584	E	6
9589	C	6
9590	B	8
9591	G	3
9601	B	7
9620	C	1
9621	D	1
9623	E	1
9624	D	1



This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram and respective parts list.

2501	C	4
2502	D	6
2513	D	4
2514	E	4
2519	E	7
2520	E	7
2523	D	6
2524	F	6
2525	C	6
2526	C	6
2527	D	7
2528	D	7
2529	D	7
2531	D	7
2532	E	7
2535	E	6
2536	F	6
2537	C	5
2538	C	5
2539	E	6
2540	F	7
2545	D	2
2546	E	2
2547	G	3
2548	G	3
2551	E	6
2552	F	6
2553	G	4
2554	F	4
2555	C	6
2557	G	2
2558	F	2
2559	E	5
2560	E	5
2561	D	4
2562	E	4
2563	D	6
2564	D	6
2573	D	1
2574	E	1
2581	D	5
2586	D	1
2590	E	5
2591	E	6
2592	F	7
2593	E	7
2594	F	7
2595	C	6
2596	C	6
2597	D	5
2603	E	3
2604	E	1
2607	C	4
2609	F	4
2610	G	4
2611	D	7
2612	E	7
2617	E	7
2618	F	7
2619	E	4
2621	D	5
2622	E	5
2623	C	4
2624	E	4
2625	C	4
2626	C	4
2627	F	4
2630	C	7
2632	F	1
2637	C	7
2638	D	8
2641	B	4
2643	E	3
2646	D	6
2647	D	6
2648	D	1
2649	C	1
2650	D	2
2651	D	2
2652	D	1
2653	D	1
2654	C	8
2671	B	1
2672	B	1
2673	B	1
2674	B	1
2675	B	2
2676	B	2
2677	C	4
2678	G	2
3501	C	5
3503	F	5
3504	F	5
3505	B	5
3506	C	5
3507	C	6
3508	C	6
3509	C	6
3510	D	5
3511	C	5
3512	F	5
3513	C	4
3514	F	5
3515	D	4
3516	F	4
3517	D	4
3518	E	4
3519	B	7
3520	D	5
3521	C	6
3522	D	6
3523	A	6
3524	A	6
3525	B	6
3526	A	6
3527	C	6
3528	D	6
3529	E	3
3530	E	3
3531	F	6
3532	E	6
3533	E	6
3534	F	7
3535	E	6
3536	F	7
3537	E	6
3538	E	7
3539	D	6
3540	F	6
3541	E	7
3542	F	7
3543	E	7
3544	F	7
3545	G	6
3546	G	7
3548	B	4
3549	E	6
3550	F	6
3551	E	7
3552	F	6
3553	E	7
3554	E	7
3555	E	6
3556	F	6
3557	D	7
3558	E	7
3559	E	5
3560	E	5
3561	D	7
3562	E	7
3563	D	7
3564	E	7
3566	D	8
3568	G	8
3569	F	4
3570	F	4
3571	D	1
3572	E	1
3573	D	5
3574	E	5
3575	G	6
3577	E	5
3578	F	6
3580	B	4
3581	E	3
3585	F	3
3586	E	3
3588	F	4
3589	A	8
3591	B	4
3592	C	4
3593	D	1
3594	E	1
3595	F	3
3596	F	4
3597	B	7
3598	B	7
3601	D	5
3602	E	5
3603	E	7
3604	F	7
3605	C	4
3606	F	4
3608	C	6
3609	C	6
3611	E	7
3612	D	7
3613	E	6
3618	D	2
3619	C	1
3633	C	8
3634	C	8
3636	D	8
3639	G	4
3640	F	4
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3654	F	1
3655	C	7
3656	D	8
3657	C	7
3658	D	7
3661	B	7
3662	D	6
3663	D	6
3664	D	6
3666	C	8
3667	C	8
3668	C	8
3671	E	2
3672	E	2
3673	D	2
3674	E	2
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3682	E	2
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3702	B	1
3907	C	7
4501	D	5
4502	D	6
4506	A	8
4508	G	4
4509	E	3
4510	G	5
4511	B	4
4512	D	8
4513	F	7
4514	B	4
4515	E	6
4517	B	6
4518	D	8
4519	B	4
4520	B	8
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4522	A	8
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4525	C	6
4526	E	5
4527	B	7
4528	B	8
4529	G	6
4530	C	7
4531	B	4
4532	F	8
4533	B	7
4534	B	4
4535	F	7
4539	F	4
4541	B	8
4542	B	8
4543	B	6
4544	D	6
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4559	D	3
4560	E	6
4561	F	8
4562	F	7
4563	E	4
4564	B	5
4565	G	4
4569	D	5
4572	B	7
4573	B	7
4574	C	8
4580	D	6
4593	C	8
4594	C	8
4600	A	3
4601	B	4
4602	A	3
4603	B	4
4604	A	4
4605	B	4
4606	C	5
4607	G	5
4608	E	4
4609	F	4
4610	F	5
4611	C	7
4612	B	6
4613	C	6
4614	F	5
4615	E	6
4616	D	6
4617	C	7
4618	D	3
4619	F	4
4620	F	4
4621	G	5
4622	B	8
4623	D	6
4624	D	6
4625	C	7
4626	B	8
4627	C	8
4628	B	7
4629	B	7
4630	B	7
4631	F	6
4632	C	5
4640	A	8
4641	A	8
4642	A	7
4643	B	5
4644	A	5
4645	B	5
4650	D	1
4651	E	1
4652	D	2
4653	B	7
4657	C	8
7501	D	7
7502	D	8
7503	F	4
7504	F	4
7505	B	4
7507	C	6
7510	C	8
7511	C	7
7512	F	4
7513	E	3
7514	F	3
7516	G	7
7517	E	6
7518	F	7
7519	E	7
7520	F	7
7521	D	6
7522	D	6
7523	C	4
7553	E	4
45658	D	1

CIRCUIT DIAGRAM

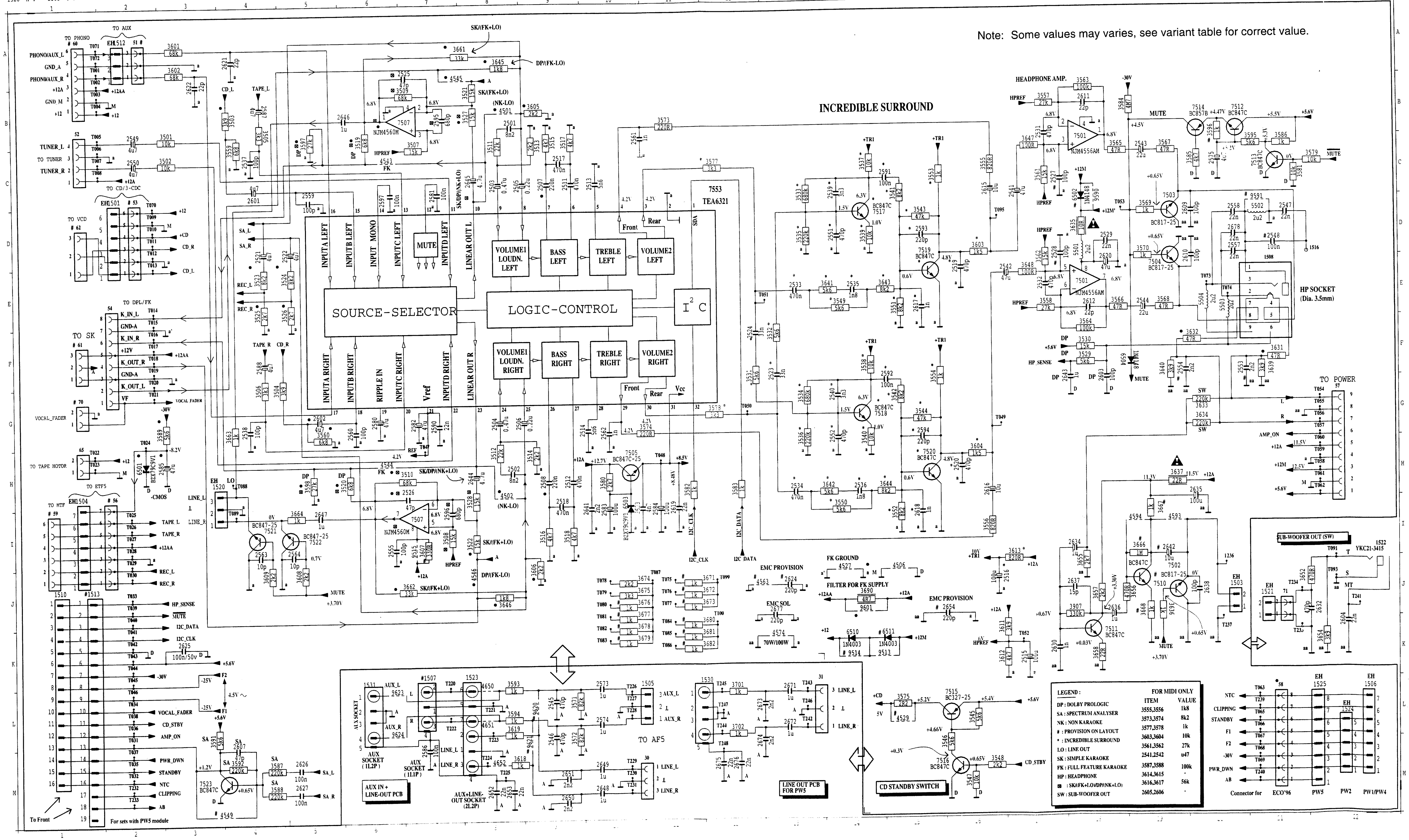
1501	C 2	1521	J21	2506	G 8	2520	H16	2533	E13	2545	L 9	2558	D20	2582	G 7
1503	J20	1522	I22	2507	C 9	2521	D 4	2534	H13	2546	L 9	2559	C 5	2583	I10
1504	H 1	1523	K 8	2508	H 9	2522	D 5	2535	E14	2547	D21	2560	G 6	2584	I11
1505	K11	1524	L22	2511	C 9	2523	F13	2536	H14	2548	D21	2561	B10	2585	H 3
1506	L22	1525	L22	2512	H 9	2524	F12	2537	C 4	2549	B 2	2562	G10	2586	M 7
1507	K 7	1530	K11	2513	C10	2525	A 7	2538	G 4	2550	C 2	2563	I 4	2587	B 4
1508	E21	1531	K 6	2514	G10	2526	H 7	2539	C14	2551	D14	2564	I 5	2588	F 4
1510	J 1	2501	B 8	2515	K17	2527	C17	2540	G14	2552	G14	2573	K10	2590	G 7
1512	A 2	2502	H 8	2516	J16	2528	D17	2541	C17	2553	F20	2574	L10	2591	C15
1513	J 1	2503	C 8	2517	C 9	2529	D18	2542	E17	2554	F19	2575	C20	2592	F15
1516	D22	2504	G 8	2518	H 9	2531	B17	2543	C19	2555	I 6	2580	G 6	2593	D15
1520	H 4	2505	C 8	2519	E16	2532	E17	2544	E19	2557	D20	2581	C 7	2594	G15

2595	B 7	2615	C16	2627	M 5	2645	C 8	2673	L12	3505	B 4	3517	B 9	3529	F18
2596	I 7	2616	H16	2630	K17	2646	B 6	2674	L12	3506	G 4	3518	I 9	3530	F18
2597	C 6	2617	E15	2632	J22	2647	I 5	2675	M12	3507	C 7	3519	B 6	3531	F12
2601	C 4	2618	I15	2634	I18	2648	M10	2676	M12	3508	I 7	3520	H 6	3532	F13
2602	G 5	2619	I11	2635	H20	2649	M10	2677	J13	3509	B 7	3521	B 8	3533	C13
2603	F18	2620	E18	2636	J18	2650	M 9	2678	D20	3510	H 7	3522	I 8	3534	G13
2604	K22	2621	A 4	2637	J18	2651	M 9	30	M10	3511	C 8	3523	E 4	3535	D13
2607	L 4	2622	A 3	2638	J20	2652	M 8	31	K13	3512	H 8	3524	E 5	3536	G13
2609	D20	2623	I10	2641	I10	2653	M 8	3501	B 3	3513	C 9	3525	E 4	3537	C14
2610	E20	2624	J13	2642	I19	2654	J16	3502	C 3	3514	H 9	3526	E 5	3538	F14
2611	B18	2625	K 3	2643	F18	2671	L13	3503	B 4	3515	B 9	3527	B 8	3539	D14
2612	E18	2626	M 5	2644	H 8	2672	L13	3504	G 4	3516	I 9	3528	H 8	3540	G14

3541	C15	3553	C15	3566	E18	3579	C22	3592	M 4	3606	J 9	3634	G20	3647	C17
3542	G15	3554	F15	3567	C19	3580	H10	3593	L 8	3607	I 7	3635	D18	3648	E17
3543	D15	3555	C16	3568	E19	3581	C21	3594	L 8	3608	J 5	3636	J19	3652	J21
3544	G15	3556	I16	3569	D19	3582	H11	3595	C21	3609	J 4	3637	H19	3654	K22
3545	L16	3557	B17	3570	D19	3583	H12	3596	B20	3611	K16	3639	F21	3655	J18
3546	M15	3558	E17	3571	L 9	3584	B18	3597	B 5	3612	K16	3640	F19	3656	J19
3547	M16	3559	C 4	3572	L 9	3585	C20	3598	H 5	3613	I17	3641	E14	3657	J18
3548	M16	3560	G 5	3573	B11	3586	C21	3601	A 3	3618	M 8	3642	H14	3658	K18
3549	E14	3561	C17	3574	G11	3587	M 4	3602	A 3	3619	L 8	3643	E15	3661	A 8
3550	I14	3563	B18	3575	L15	3588	M 4	3603	D16	3631	F21	3644	H15	3662	J 7
3551	E15	3564	F18	3577	C12	3589	G 2	3604	H16	3632	F20	3645	A 8	3663	G 4
3552	I15	3565	C18	3578	G12	3591	L 3	3605	B 9	3633	G20	3646	J 8	3664	I 5

3666	I19	3680	J12	4543	C 6	51	A 2	60	A 1	7501	B18	7514	B20	9514	K14
3667	I19	3681	K12	4544	H 6	52	B 1	61	F 1	7501	E18	7515	L15	9515	I 7
3668	J19	3682	K12	4545	A 7	53	C 2	62	D 1	7502	J19	7516	M15	9590	C18
3671	J12	3690	J14	4546	J 8	54	E 2	65	G 1	7503	D19	7517	D15	9591	D21
3672	J12	3701	L12	4549	M 4	5501	D18	6501	H 2	7504	E19	7518	G15	9601	J14
3673	J12	3702	L12	4563	J12	5502	D21	6502	C18	7505	H10	7519	D15	9620	L 9
3674	J10	3907	J18	4574	K13	5503	E20	6503	H10	7507	B 6	7520	H15	9621	L 9
3675	J10	4501	B 8	4593	I19	5504	E20	6504	F19	7507	I 7	7521	I 4	9623	L 6
3676	J10	4502	H 8	4594	I19	56	H 2	6510	K14	7510	J19	7522	I 5	9624	L 6
3677	J10	4506	J15	4650	L 8	57	G22	6511	K15	7511	K18	7523	M 3		
3678	K10	4527	J14	4651	L 8	58	L21	70	G 1	7512	B20	7553	C12		
3679	K10	4529	L15	4652	M 8	59	I 1	71	J21	7513	C21	9513	K14		

Note: Some values may varies, see variant table for correct value.


TO PHONO
TO AUX
PHONO/AUX_L
GND_A
PHONO/AUX_R
TUNER_L
TO TUNER
TUNER_R
TO CD/3-CDC
TO VCD
CD_L
CD_R
TO DPL/FK
TO SK
K_IN_L
K_IN_R
K_OUT_R
K_OUT_L
VOCAL_FADER
TO TAPE MOTOR
TO ETF5
TO MTF
TAPE_L
TAPE_R
REC_L
REC_R
HP_SENSE
MUTE
I2C_DATA
I2C_CLK
CD_STBY
AMP_ON
PWR_DWN
STANDBY
NTC
CLIPPING
AB
To Front
For sets with PW5 module
SK/(FK+LO)
DP/(FK-LO)
NJM4560M
7507
SOURCE-SELECTOR
LOGIC-CONTROL
I2C
INPUTA LEFT
INPUTB LEFT
INPUT MONO
INPUTC LEFT
MUTE
INPUTD LEFT
LINEAR OUT L
VOLUME1 LOUDN. LEFT
BASS LEFT
TREBLE LEFT
VOLUME2 LEFT
INPUTA RIGHT
INPUTB RIGHT
RIPPLE IN
INPUTC RIGHT
Vref
INPUTD RIGHT
LINEAR OUT R
VOLUME1 LOUDN. RIGHT
BASS RIGHT
TREBLE RIGHT
VOLUME2 RIGHT
Front
Rear
Vcc
SDA
7553
TEA6321
INCREDIBLE SURROUND
BC847C
HEADPHONE AMP.
NJM4556AM
7501
MUTE
HP SOCKET
(Dia. 3.5mm)
TO POWER
AMP_ON
SUB-WOOFER OUT (SW)
YKC21-3415
EMC PROVISION
FK GROUND
FILTER FOR FK SUPPLY
EMC SOL
70W/100W
1N4003
AUX SOCKET
AUX IN + LINE-OUT PCB
AUX+LINE-OUT SOCKET (2L2P)
TO AF5
LINE OUT PCB FOR PW5
CD STANDBY SWITCH
Connector for
ECO'96
PW5
PW2
PW1/PW4

LEGEND :

DP : DOLBY PROLOGIC
SA : SPECTRUM ANALYSER
NK : NON KARAOKE
: PROVISION ON LAYOUT
* : INCREDIBLE SURROUND
LO : LINE OUT
SK : SIMPLE KARAOKE
FK : FULL FEATURE KARAOKE
HP : HEADPHONE
⊠ : SK/(FK+LO)/DP/(NK+LO)
SW : SUB-WOOFER OUT

FOR MIDI ONLY

ITEM	VALUE
3555,3556	1k8
3573,3574	8k2
3577,3578	1k
3603,3604	10k
3561,3562	27k
2541,2542	u47
3587,3588	100k
3614,3615	-
3616,3617	56k
2605,2606	-

4650, 4651 } Used when 1507 OR 1523 is used

1531, 9623, 9624 } For Power 5 Only

9620, 9621 } Provision for Dual Aux-In

MISCELLANEOUS

1508	4822 267 40898	Headphone Socket
1513	4822 267 10737	Connector 18 pin
1522	4822 267 31729	Cinch Socket, Sub-woofer out
1530	4822 267 20452	Cinch Socket, Line-out
1531	4822 267 20452	Cinch Socket, Aux-in

CAPACITORS

2501	4822 122 33336	8,2nF 10% 50V
2502	4822 122 33336	8,2nF 10% 50V
2503	4822 124 41407	0,47µF 20% 63V
2504	4822 124 41407	0,47µF 20% 63V
2505	4822 124 40746	0,22µF 20% 63V
2506	4822 124 40746	0,22µF 20% 63V
2507	4822 121 42408	220nF 5% 63V
2508	4822 121 42408	220nF 5% 63V
2511	4822 121 51252	470nF 5% 63V
2512	4822 121 51252	470nF 5% 63V
2513	4822 122 32646	5,6nF 10% 50V
2514	4822 122 32646	5,6nF 10% 50V
2515	4822 124 81029	100µF 20% 25V
2516	4822 124 81029	100µF 20% 25V
2517	4822 121 51252	470nF 5% 63V
2518	4822 121 51252	470nF 5% 63V
2519	5322 122 32268	470pF 10% 50V
2520	5322 122 32268	470pF 10% 50V
2521	4822 124 40246	4,7µF 20% 63V
2522	4822 124 40246	4,7µF 20% 63V
2523	4822 126 12105	33nF 5% 63V
2524	4822 126 12105	33nF 5% 63V
2525	4822 126 13692	47pF 1% 63V
2526	4822 126 13692	47pF 1% 63V
2529	5322 122 32654	22nF 10% 63V
2531	5322 122 32268	470pF 10% 50V
2532	5322 122 32268	470pF 10% 50V
2533	4822 121 51252	470nF 5% 63V
2534	4822 121 51252	470nF 5% 63V
2535	4822 122 33219	1,8nF 10% 50V
2536	4822 122 33219	1,8nF 10% 50V
2537	5322 122 32531	100pF 5% 50V
2538	5322 122 32531	100pF 5% 50V
2539	4822 122 33891	3,3nF 10% 63V
2540	4822 122 33891	3,3nF 10% 63V
2541	4822 124 40433	47µF 20% 25V
2542	4822 124 40433	47µF 20% 25V
2543	4822 124 81151	22µF 50V
2544	4822 124 81151	22µF 50V
2545	5322 122 32268	470pF 10% 50V
2546	5322 122 32268	470pF 10% 50V
2547	5322 122 32654	22nF 10% 63V
2549	4822 124 40246	4,7µF 20% 63V
2550	4822 124 40246	4,7µF 20% 63V
2551	5322 122 32268	470pF 10% 50V
2552	5322 122 32268	470pF 10% 50V
2555	5322 122 32531	100pF 5% 50V
2557	5322 122 32654	22nF 10% 63V
2558	5322 122 32654	22nF 10% 63V
2559	5322 122 32531	100pF 5% 50V
2560	5322 122 32531	100pF 5% 50V
2561	5322 122 34123	1nF 10% 50V
2562	5322 122 34123	1nF 10% 50V
2563	5322 122 32448	10pF 5% 50V
2564	5322 122 32448	10pF 5% 50V
2573	4822 126 13836	1µF 16V
2574	4822 126 13836	1µF 16V
2575	4822 124 40246	4,7µF 20% 63V
2580	4822 124 40433	47µF 20% 25V
2581	4822 126 13838	100nF +80/-20% 50V
2582	4822 124 41751	47µF 20% 50V
2583	4822 124 81029	100µF 20% 25V
2584	4822 124 81029	100µF 20% 25V
2585	4822 124 41751	47µF 20% 50V
2586	4822 126 13838	100nF +80/-20% 50V
2587	4822 124 40246	4,7µF 20% 63V
2588	4822 124 40246	4,7µF 20% 63V
2590	5322 122 32654	22nF 10% 63V
2591	4822 126 13838	100nF +80/-20% 50V
2592	4822 126 13838	100nF +80/-20% 50V
2593	4822 122 33575	220pF 5% 50V
2594	4822 122 33575	220pF 5% 50V
2595	4822 122 32535	680pF 10% 63V
2596	4822 122 32535	680pF 10% 63V
2597	4822 126 13838	100nF +80/-20% 50V
2601	4822 124 40246	4,7µF 20% 63V
2602	4822 124 40246	4,7µF 20% 63V
2603	5322 122 32531	100pF 5% 50V
2604	5322 122 32654	22nF 10% 63V
2607	4822 126 13692	47pF 1% 63V
2609	5322 122 32531	100pF 5% 50V
2610	5322 122 32531	100pF 5% 50V
2611	5322 122 32658	22pF 5% 50V
2612	5322 122 32658	22pF 5% 50V
2615	4822 124 41579	10µF 20% 50V
2616	4822 124 41579	10µF 20% 50V
2617	5322 122 34123	1nF 10% 50V
2618	5322 122 34123	1nF 10% 50V
2619	5322 122 32654	22nF 10% 63V
2620	4822 124 40433	47µF 20% 25V
2621	5322 122 32658	22pF 5% 50V
2622	5322 122 32658	22pF 5% 50V
2623	5322 126 10223	4,7nF 10% 63V
2625	4822 126 13838	100nF +80/-20% 50V
2626	4822 126 13838	100nF +80/-20% 50V
2627	4822 126 13838	100nF +80/-20% 50V
2630	5322 122 34123	1nF 10% 50V

2632	5322 122 32268	470pF 10% 50V
2634	4822 124 40242	1µF 20% 63V
2635	4822 124 81029	100µF 20% 25V
2636	4822 124 40242	1µF 20% 63V
2637	4822 126 13486	15pF 2% 63V
2638	5322 122 32531	100pF 5% 50V
2641	4822 122 33175	2,2nF 20% 50V
2643	4822 126 13836	1µF 16V
2644	4822 124 40246	4,7µF 20% 63V
2645	4822 124 40246	4,7µF 20% 63V
2646	4822 126 13836	1µF 16V
2647	4822 126 13836	1µF 16V
2671	4822 126 13836	1µF 16V
2672	4822 126 13836	1µF 16V
2673	4822 122 33175	2,2nF 20% 50V
2674	4822 122 33175	2,2nF 20% 50V
2675	5322 122 32654	22nF 10% 63V
2676	5322 122 32654	22nF 10% 63V
2677	4822 122 33575	220pF 5% 50V
2678	5322 122 32654	22nF 10% 63V

RESISTORS

3501	4822 117 10833	10k 1% 0,1W
3502	4822 116 83864	10k 5% 0,5W
3503	4822 051 20562	5k6 5% 0,1W
3503	4822 051 20392	3k9 5% 0,1W
3504	4822 051 20562	5k6 5% 0,1W
3504	4822 051 20392	3k9 5% 0,1W
3505	4822 051 20332	3k3 5% 0,1W
3506	4822 051 20332	3k3 5% 0,1W
3507	4822 051 20153	15k 5% 0,1W
3508	4822 051 20153	15k 5% 0,1W
3509	4822 051 20683	68k 5% 0,1W
3510	4822 051 20683	68k 5% 0,1W
3511	4822 051 20223	22k 5% 0,1W
3512	4822 051 20223	22k 5% 0,1W
3513	4822 117 11449	2k2 1% 0,1W
3514	4822 117 11449	2k2 1% 0,1W
3515	4822 051 20472	4k7 5% 0,1W
3516	4822 051 20472	4k7 5% 0,1W
3517	4822 051 20472	4k7 5% 0,1W
3518	4822 051 20472	4k7 5% 0,1W
3519	4822 117 11507	6k8 1% 0,1W
3520	4822 117 11507	6k8 1% 0,1W
3523	4822 051 20822	8k2 5% 0,1W
3524	4822 051 20822	8k2 5% 0,1W
3525	4822 117 12955	2k7 1% 0,1W
3526	4822 117 12955	2k7 1% 0,1W
3527	4822 051 20153	15k 5% 0,1W
3528	4822 051 20153	15k 5% 0,1W
3529	4822 051 20562	5k6 5% 0,1W
3530	4822 051 20153	15k 5% 0,1W
3531	4822 051 20562	5k6 5% 0,1W
3532	4822 051 20562	5k6 5% 0,1W
3533	4822 051 20684	680k 5% 0,1W
3534	4822 051 20684	680k 5% 0,1W
3535	4822 051 20224	220k 5% 0,1W
3536	4822 051 20224	220k 5% 0,1W
3537	4822 117 10833	10k 1% 0,1W
3538	4822 117 10833	10k 1% 0,1W
3539	4822 117 10833	10k 1% 0,1W
3540	4822 117 10833	10k 1% 0,1W
3541	4822 051 20822	8k2 5% 0,1W
3542	4822 051 20822	8k2 5% 0,1W
3543	4822 117 10834	47K 1% 0,1W
3544	4822 117 10834	47K 1% 0,1W
3545	4822 051 20562	5k6 5% 0,1W
3546	4822 051 20562	5k6 5% 0,1W
3547	4822 116 83864	10k 5% 0,5W
3548	4822 117 11449	2k2 1% 0,1W
3549	4822 051 20562	5k6 5% 0,1W
3550	4822 051 20562	5k6 5% 0,1W
3551	4822 051 20822	8k2 5% 0,1W
3552	4822 051 20822	8k2 5% 0,1W
3553	4822 051 10102	1k 2% 0,25W
3554	4822 051 10102	1k 2% 0,25W
3555	4822 117 11454	820R 1% 0,1W
3556	4822 117 11454	820R 1% 0,1W
3557	4822 051 20273	27k 5% 0,1W
3558	4822 051 20273	27k 5% 0,1W
3559	4822 117 11507	6k8 1% 0,1W
3560	4822 117 11507	6k8 1% 0,1W
3561	4822 051 20153	15k 5% 0,1W
3562	4822 051 20153	15k 5% 0,1W
3563	4822 051 20104	100k 5% 0,1W
3564	4822 051 20104	100k 5% 0,1W
3565	4822 116 52195	47R 5% 0,5W
3566	4822 051 20479	47R 5% 0,1W
3567	4822 116 52195	47R 5% 0,5W
3568	4822 051 20479	47R 5% 0,1W
3569	4822 051 10102	1k 2% 0,25W
3570	4822 051 10102	1k 2% 0,25W
3571	4822 117 11149	82k 1% 0,1W
3572	4822 117 11149	82k 1% 0,1W
3573	4822 117 11503	220R 1% 0.1W
3574	4822 117 11503	220R 1% 0.1W
3575	4822 051 20228	2R2 5% 0,1W
3577	4822 051 20472	4k7 5% 0,1W
3578	4822 051 20472	4k7 5% 0,1W
3579	4822 116 83864	10k 5% 0,5W
3580	4822 117 12955	2k7 1% 0,1W
3581	4822 117 10833	10k 1% 0,1W
3582	4822 050 11002	1k 1% 0,4W
3583	4822 050 11002	1k 1% 0,4W

ELECTRICAL PARTS LIST - AF5 BOARD

RESISTORS

3584	4822 050 24705		4M7 1% 0,6W
3585	4822 051 20472		4k7 5% 0,1W
3586	4822 051 10102		1k 2% 0,25W
3587	4822 116 83874		220k 5% 0,5W
3588	4822 051 20224		220k 5% 0,1W
3589	4822 051 20562		5k6 5% 0,1W
3591	4822 051 20562		5k6 5% 0,1W
3592	4822 051 20224		220k 5% 0,1W
3593	4822 051 10102		1k 2% 0,25W
3594	4822 051 10102		1k 2% 0,25W
3595	4822 051 20562		5k6 5% 0,1W
3597	4822 051 20273		27k 5% 0,1W
3598	4822 051 20273		27k 5% 0,1W
3601	4822 051 20683		68k 5% 0,1W
3602	4822 051 20683		68k 5% 0,1W
3603	4822 117 11139		1k5 1% 0,1W
3604	4822 117 11139		1k5 1% 0,1W
3605	4822 117 11449		2k2 1% 0,1W
3605	4822 051 20122		1k2 5% 0,1W
3606	4822 117 11449		2k2 1% 0,1W
3606	4822 051 20122		1k2 5% 0,1W
3608	4822 117 11449		2k2 1% 0,1W
3609	4822 117 11449		2k2 1% 0,1W
3611	4822 051 20392		3k9 5% 0,1W
3612	4822 051 20472		4k7 5% 0,1W
3613	4822 117 11454		820R 1% 0,1W
3631	4822 116 52195		47R 5% 0,5W
3632	4822 116 52195		47R 5% 0,5W
3633	4822 051 20224		220k 5% 0,1W
3634	4822 051 20224		220k 5% 0,1W
3635	4822 052 10109	⚠	10R 5% 0,33W
3636	4822 051 10102		1k 2% 0,25W
3637	4822 052 10229	⚠	22R 5% 0,33W
3639	4822 051 20392		3k9 5% 0,1W
3640	4822 051 20392		3k9 5% 0,1W
3641	4822 051 20562		5k6 5% 0,1W
3642	4822 051 20562		5k6 5% 0,1W
3643	4822 051 20822		8k2 5% 0,1W
3644	4822 051 20822		8k2 5% 0,1W
3645	4822 051 20182		1k8 5% 0,1W
3646	4822 051 20182		1k8 5% 0,1W
3647	4822 051 20101		100R 5% 0,1W
3648	4822 051 20101		100R 5% 0,1W
3652	4822 051 20471		470R 5% 0,1W
3654	4822 051 20392		3k9 5% 0,1W
3655	4822 117 12955		2k7 1% 0,1W
3656	4822 051 20471		470R 5% 0,1W
3657	4822 117 11449		2k2 1% 0,1W
3658	4822 051 20229		22R 5% 0,1W
3663	4822 051 10102		1k 2% 0,25W
3664	4822 051 10102		1k 2% 0,25W
3674	4822 051 20472		4k7 5% 0,1W
3675	4822 117 11449		2k2 1% 0,1W
3675	4822 051 20332		3k3 5% 0,1W
3690	4822 052 10478		4R7 5% 0,33W
3701	4822 051 10102		1k 2% 0,25W
3702	4822 051 10102		1k 2% 0,25W
3907	4822 051 20334		330k 5% 0,1W
4506	4822 051 20008		0R Jumper 0805
4508	4822 051 10008		0R Jumper 1206
4509	4822 051 20008		0R Jumper 0805
4510	4822 051 10008		0R Jumper 1206
4512	4822 051 20008		0R Jumper 0805
4513	4822 051 20008		0R Jumper 0805
4514	4822 051 20008		0R Jumper 0805
4515	4822 051 10008		0R Jumper 1206
4517	4822 051 20008		0R Jumper 0805
4518	4822 051 20008		0R Jumper 0805
4519	4822 051 10008		0R Jumper 1206
4520	4822 051 10008		0R Jumper 1206
4521	4822 051 20008		0R Jumper 0805
4522	4822 051 10008		0R Jumper 1206
4523	4822 051 20008		0R Jumper 0805
4524	4822 051 10008		0R Jumper 1206
4525	4822 051 10008		0R Jumper 1206
4526	4822 051 20008		0R Jumper 0805
4527	4822 051 20008		0R Jumper 0805
4528	4822 051 20008		0R Jumper 0805
4530	4822 051 20008		0R Jumper 0805
4531	4822 051 10008		0R Jumper 1206
4532	4822 051 20008		0R Jumper 0805
4533	4822 051 10008		0R Jumper 1206
4534	4822 051 20008		0R Jumper 0805
4535	4822 051 20008		0R Jumper 0805
4539	4822 051 20008		0R Jumper 0805
4541	4822 051 20008		0R Jumper 0805
4542	4822 051 20008		0R Jumper 0805
4548	4822 051 20008		0R Jumper 0805
4550	4822 051 20008		0R Jumper 0805
4551	4822 051 20008		0R Jumper 0805
4552	4822 051 20008		0R Jumper 0805
4553	4822 051 20008		0R Jumper 0805
4554	4822 051 20008		0R Jumper 0805
4555	4822 051 10008		0R Jumper 1206
4556	4822 051 20008		0R Jumper 0805
4557	4822 051 10008		0R Jumper 1206
4558	4822 051 10008		0R Jumper 1206
4559	4822 051 10008		0R Jumper 1206
4560	4822 051 10008		0R Jumper 1206
4561	4822 051 20008		0R Jumper 0805
4562	4822 051 10008		0R Jumper 1206
4569	4822 051 10008		0R Jumper 1206
4572	4822 051 10008		0R Jumper 1206
4573	4822 051 20008		0R Jumper 0805

ELECTRICAL PARTS LIST - AF5 BOARD

RESISTORS

4574	4822 051 20008	0R Jumper 0805
4580	4822 051 10008	0R Jumper 1206
4593	4822 051 20008	0R Jumper 0805
4594	4822 051 20008	0R Jumper 0805
4600	4822 051 20008	0R Jumper 0805
4601	4822 051 10008	0R Jumper 1206
4602	4822 051 10008	0R Jumper 1206
4603	4822 051 10008	0R Jumper 1206
4604	4822 051 10008	0R Jumper 1206
4605	4822 051 10008	0R Jumper 1206
4606	4822 051 20008	0R Jumper 0805
4607	4822 051 20008	0R Jumper 0805
4608	4822 051 20008	0R Jumper 0805
4609	4822 051 20008	0R Jumper 0805
4610	4822 051 20008	0R Jumper 0805
4611	4822 051 10008	0R Jumper 1206
4612	4822 051 10008	0R Jumper 1206
4613	4822 051 20008	0R Jumper 0805
4614	4822 051 20008	0R Jumper 0805
4615	4822 051 10008	0R Jumper 1206
4616	4822 051 10008	0R Jumper 1206
4617	4822 051 10008	0R Jumper 1206
4618	4822 051 10008	0R Jumper 1206
4622	4822 051 10008	0R Jumper 1206
4623	4822 051 20008	0R Jumper 0805
4624	4822 051 20008	0R Jumper 0805
4625	4822 051 10008	0R Jumper 1206
4626	4822 051 10008	0R Jumper 1206
4628	4822 051 10008	0R Jumper 1206
4629	4822 051 20008	0R Jumper 0805
4630	4822 051 20008	0R Jumper 0805
4631	4822 051 20008	0R Jumper 0805
4632	4822 051 20008	0R Jumper 0805
4640	4822 051 20008	0R Jumper 0805
4641	4822 051 10008	0R Jumper 1206
4642	4822 051 20008	0R Jumper 0805
4643	4822 051 10008	0R Jumper 1206
4644	4822 051 20008	0R Jumper 0805
4645	4822 051 20008	0R Jumper 0805
4650	4822 051 20008	0R Jumper 0805
4651	4822 051 20008	0R Jumper 0805
4653	4822 051 20008	0R Jumper 0805
4657	4822 051 20008	0R Jumper 0805

COILS & FILTERS

5501	4822 156 21721	Fixed Inductor 2,2µH 10%
5502	4822 156 21721	Fixed Inductor 2,2µH 10%
5503	4822 156 21721	Fixed Inductor 2,2µH 10%
5504	4822 156 21721	Fixed Inductor 2,2µH 10%

DIODES

6501	4822 130 30862	BZX79-B9V1
6503	4822 130 30862	BZX79-B9V1
6504	4822 130 30621	1N4148
6510	4822 130 31878	1N4003G

TRANSISTORS & INTEGRATED CIRCUITS

7501	4822 209 31378	NJM4556AM
7502	4822 130 42804	BC817-25
7503	4822 130 42804	BC817-25
7504	4822 130 42804	BC817-25
7505	5322 130 42755	BC847C
7507	4822 209 83357	NJM4560M
7511	5322 130 42755	BC847C
7512	5322 130 42755	BC847C
7513	5322 130 42755	BC847C
7514	5322 130 60508	BC857B
7515	4822 130 41246	BC327-25
7516	5322 130 42755	BC847C
7517	5322 130 42755	BC847C
7518	5322 130 42755	BC847C
7519	5322 130 42755	BC847C
7520	5322 130 42755	BC847C
7521	5322 130 42755	BC847C
7522	5322 130 42755	BC847C
7523	5322 130 42755	BC847C
7553	4822 209 33652	TEA6321T/V1

Note: Only the parts mentioned in this list are normal service spare parts.

DOLBY PRO-LOGIC

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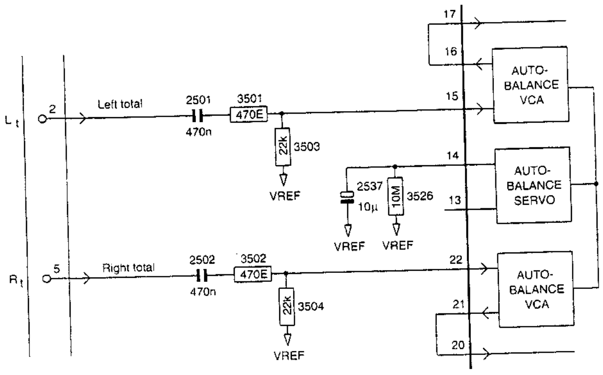
Dolby Pro-logic CD Test Description 13-3
Circuit Diagram 13-6
Layout Diagram 13-7
Electrical parts list... 13-8

CIRCUIT DESCRIPTION

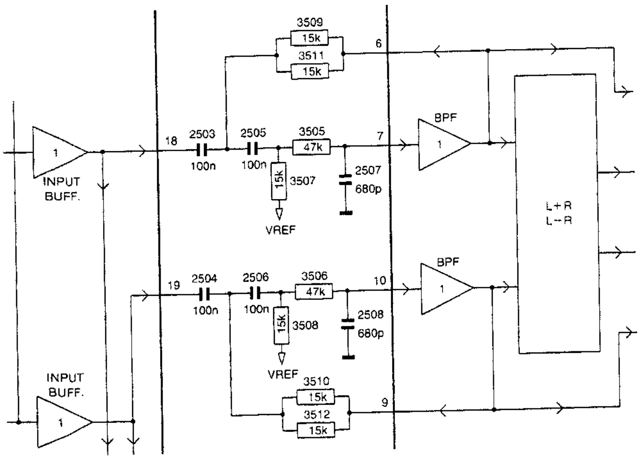
1 - Automatic balance control circuit:

The first section in the Dolby Proloic decoder IC7501 (MC69032) is Auto balance circuit, to correct input balance errors between Lt and Rt. signals.


17
16
AUTO-BALANCE VCA
15
Lt
2
Left total
2501
470n
3501
470E
22k
3503
14
VREF
2537
10µ
10M
3526
13
AUTO-BALANCE SERVO
VREF
VREF
Rt
5
Right total
2502
470n
3502
470E
22
22k
3504
21
AUTO-BALANCE VCA
20
VREF

This is vital to ensure that the following matrix stage givesoptimal results.
The previons generation (Dolby surround) haed an external Left & Right balance control.
To be able to set to correct balance the customer must first switch off the center speaker and select a dialogue. Then Left & Right can be set for minimum dialogue coming out of the Left & Right speakers.
Now through the automatically balance circuit (internally implemented) the center mode off is not needed anymore (but is still possible with this device).
FW670: No center mode OFF feature.

2 - Adaptive matrix stage
(The heart of the active decoder)

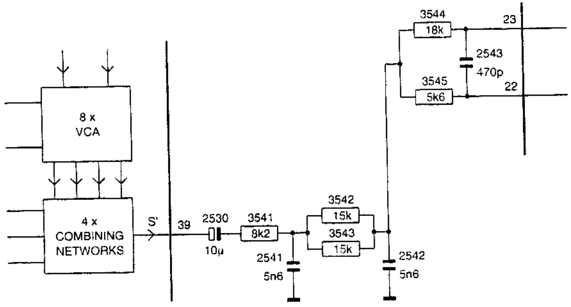

3509
15k
3511
15k
6
1
INPUT BUFF.
18
2503
100n
2505
100n
3505
47k
7
15k
3507
VREF
2507
680p
BPF
1
L+R
L−R
19
2504
100n
2506
100n
3506
47k
10
15k
3508
VREF
2508
680p
BPF
1
3510
15k
3512
15k
9
INPUT BUFF.
1

The complex matrix stage splits-up the encoded Lt - Rt signals into Left, Right, Center (L=R) and Surround (L-R) signals
The function of this circuit is to analyse continuously the two channel audio input to determine the direction and relative magnitude of the encoded soundfield (improving directional location).

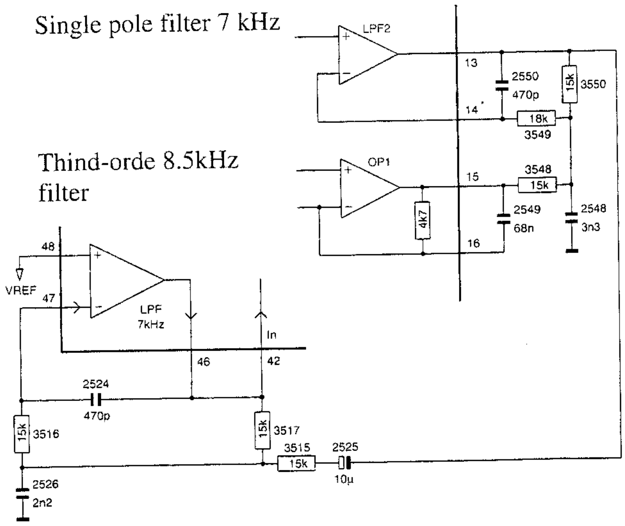
3 - Filters in surround path .

The first block in the surround path is an ANTI ALIAS filter, to prevent spurious beat product occurring as a result of the sampling process in the time delay stage.

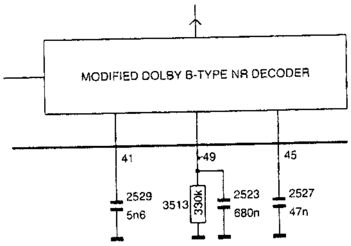
ANTI ALIAS filter,


8 x VCA
4 x COMBINING NETWORKS
S'
39
2530
10µ
3541
8k2
2541
5n6
3542
15k
3543
15k
2542
5n6
3544
18k
23
2543
470p
3545
5k6
22

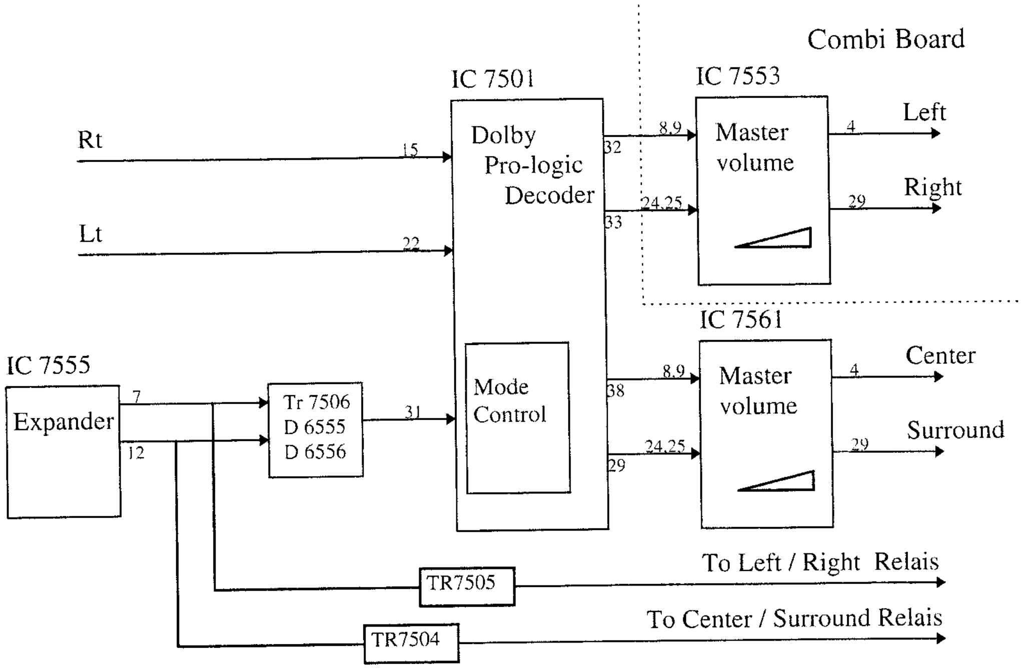
The next filter must have at least a 12 dB per octave slope above the breaking point.
A single pole filter at 7kHz is followed by a third-order filter at 8.5kHz, together giving the proper cut off frequency and steeper roll-off for rejection of BBD clock signals. (**B**ucket - **B**rigade - **D**evices)


Single pole filter 7 kHz
Thind-orde 8.5kHz filter
LPF2
13
2550
470p
15k
3550
14
18k
3549
OP1
15
3548
15k
4k7
2549
68n
2548
3n3
16
48
VREF
47
LPF
7kHz
In
46
42
2524
470p
15k
3516
15k
3517
3515
15k
2525
10µ
2526
2n2

Modified Dolby B type NR (Noise Reduction) decoder is used to reduce the signal to noise ratio in the surround channel and the leakage of high frequency components from the front into the surround channel
Modified Dolby B type NR decoder stage makes correct Dolby B decoding possible


MODIFIED DOLBY B-TYPE NR DECODER
41
49
45
2529
5n6
3513
330k
2523
680n
2527
47n

4 - Mode control circuit


Combi Board
IC 7501
IC 7553
Rt
Lt
15
22
Dolby
Pro-logic
Decoder
32
33
8,9
24,25
Master
volume
4
29
Left
Right
IC 7561
IC 7555
Expander
7
12
Tr 7506
D 6555
D 6556
31
Mode
Control
38
29
8,9
24,25
Master
volume
4
29
Center
Surround
TR7505
To Left / Right Relais
TR7504
To Center / Surround Relais

The decoded signals, left,right,center,surround can be switched into the following modes:

Channel mode:

2 channel mode :

original stereo mode (Left and Right output)
- pin7 = high, pin12 = low IC 7555
- pin 31 = low IC 7501

3 channel mode :

No surround speaker available (L,R,C)
The surround information is equally added to the left and right outputs.
-pin 7= low, pin 12 high IC 7555
-pin31 = open input IC 7501 (typical 2...3V)

4 channel mode :

Pro-logic --> all four outputs are used (L,R C,S)
-pin7 = high, pin 12 high IC 7555
-pin31 = high IC 7501

Center mode:

center mode Wide :

Full frequency range in center channel 20Hz.....20kHz. The customer needs a better specified center speaker for this mode (with woofer)

center mode Normal :

-3 dB breakpoint (roll off) at 100Hz, frequency response 100 Hz......20kHz .The customer can place a simple center speaker . To prevent loss of Bass center information these bass < 100Hz is equally added to the left and right full wave speakers.

center mode Phantom :

No center speaker available. To prevent loss of center information these center information (20Hz......20kHz) is equally added to the left and right speakers.

TEST CD DOLBY PROLOGIC TEST DESCRIPTION

- The intention of this description is to explain the most important performance measurements for **DPL** (**D**olby **P**ro-**L**ogic) sets for service.

- Test instruments (recommended) :
  - Dolby Prologic test CD 4822 395 10216
  - AC mv meters (4x) L, C, R, S
  - Oscilloscope (double beam)
  - Distortion meter
  - CD player.

WARNING: **Be sure that the ground connection (-) of each instrument is not connecteded with the safety earth ⊥ connection. To avoid damage to output amplifiers (balance type) Use only cinch (input) ground connection**

STARTING CONDITION :

- Replace the loudspeakers for all four output amplifiers with loud resistors according the output impedance for each amplifier (or use 8 Ω as standard loudresistor).
- Set volume to min. position
- Switch off all features like ASP setting, DBB etc...
- Set "TONE CONTROL" in "FLAT" mode.
- Select the "PRO LOGIC" mode.
- Select "WIDE" mode for Centre channel in sets with this options.
- Set time delay in Surround channel at 20 msec. in sets with variable time delay.
- Dolby Prologic test CD in CD player.

SERVICE TEST DESCRIPTION

Test 1 : *Output and balance setting for all four channels*

Select track 2 :

Adjust L, C, R and S for ≈ 1W output on the loudresistor with master volume. Adjust with L/R balance and Centre/Surround "TRIM" all four channels to equal level (equal meter readings)

Note: 1Watt output corresponds with 2.83V across 8 Ω

$P = U^2/R \rightarrow U = \sqrt{P \times R} = \sqrt{1 \times 8} = 2{,}83V$

Test 2 : *Frequency response for Left and Right channel*

Requirement : -3 dB points at ≤ 50 Hz and ≥ 15 kHz

Select track 3:

measure (and note) the overall gain of Left channel across the load resistor.

Select track 4:

measure (and note) the overall gain on Right channel across the load resistor.

Test 3 : *Frequency response for Center channel*

2 possibilitie :

1- Center mode "wide" requirements : -3 dB at ≤ 50 Hz and > 15 kHz (same as L/R requirements)

2- Center mode "normal" requirements : -3 dB point at ± 100 Hz and ≥ 15 kHz (the difference is the roll-off behaviour of the bass frequencies).

Select track 5 :

measure (and note) the overall gain of Center channel across the load resistor in "wide" mode (only in sets with this option) and repeat this measurement in "normal" mode.

Test 4 : *Frequency response for Surround channel*

Surround requirements : -3 dB point at ≤ 100 Hz and ± 7 kHz (6 kHz ... 8 kHz)

The difference is the roll-off behaviour of the high treble frequencies.

Select track 6 :

measure (and note) the overall gain of Surround channel across the loud resistor.

Test 5 : *Modified Dolby B type NR decoding freq. response of the Surround channel*

Requirement : Roll off behaviour at ± 5 kHz related to 100 Hz. In this case use 100 Hz as 0 dB reference gain.
Select track 14:
measure (and note) the overall gain of Surround channel across the load resistor.
Note : The output level on track 14 = -35 dB below the 1W output reference of the Surround channel.

Test 6 : *Total harmonic distortion measurements for Left, Center, Right, Surround channels for 1 Watt output*

Note : If necessary use a special CD test filter 20 Hz ... 20 kHz between the output channel and the distortion meter to prevent spurrious products out of audio waves (> 20 kHz) from to the CD player in test.
Select track 3 :
Measure distortion at 1 kHz across the Left channel.
Output load resistor : requirement THD < 0,3 %
Select track 4 :
Measure distortion at 1 kHz across the Right channel.
Output load resistor : requirement THD < 0,3 %
Select track 5 :
Measure distortion at 1 kHz across the Center channel.
Output load resistor : requirements THD < 0,3 %
Center mode "wide" (if exists) and repeat for center mode "normal"
Select track 6 :
Measure distortion at 1 kHz across the Surround channel load resistor.
Note : time delay setting = 20 msec.
Requirement THD = < 0,5 %

Test 7: *Signal to noise measurements for Left output amplifier*

Select track 3 :
Use 1W output at 1 kHz on the Left channel output loud resistor as 0 dB reference.
Select track 13 :
(silence) and measure the S/Nratio.
Requirements for Left channel ≤ -65 dB

Test 8 : *Signal to noise measurements for Right output amplifier*

Select track 4 :
Use 1W output at 1 kHz on the Right channel output loud resistor as 0 dB reference.
Select track 13 :
(silence) and measure the S/N ratio.
Requirement for Right channel ≤ -65 dB

Test 9 : *Signal to noise measurements for Center output amplifier*

Select track 5 :
Uuse 1W output at 1 kHz on the Center channel (normal or wide mode)
Select track 13 :
(silence) and measure the S/N ratio.
Requirement for Center channel (normal or wide mode) ≤ -65 dB

Test 10 : *Signal to noise measurements for Surround output amplifier*

Select track 6 :
Use 1W output at 1 kHz on the Surround channel output loud resistor as 0 dB reference.
Select track 13 :
(silence) and measure the S/N ratio.
Requirement for Surround channel ≤ -55 dB (in all positions between 15 msec ... 30 msec in sets with variable time delay).

Cross-talk (channel separation) between adjacent and opposite channels

2 possibilities :
1- Centre mode "wide" (if exists)(use 1 kHz tone)

Test 11a:

Select track 3 :
For 1 kHz in Left channel and measure the crosstalk in Center, Right, Surround.
Requirement : < -25 dB

Test 12a :

Select track 4 for 1 kHz in Right channel and measure the crosstalk in Surround , Left, Center.
Requirement : < -25 dB

Test 13a :
Select track 5 :
For 1 kHz in Center channel and measure the crosstalk in Left, Right, Surround.
Requirement : < -25 dB

Test 14a :
Select track 6 :
For 1 kHz in Surround channel and measure the crosstalk in Left, Center, Right.
Requirement : < -25 dB

2- Centre mode "normal" (use 3 kHz or 1 kHz tone)

Test 11b :
Select track 3 :
For 3 kHz in Left channel and measure the crosstalk in Center, Right, Surround
Requirement : < -25 dB

Test 12b :
Select track 4 :
For 3 kHz in Right channel and measure the crosstalk in Surround, Left, Center
Requirement : < -25 dB

Test 13b :
Select track 5 :
For 3 kHz in Centre channel and measure the crosstalk in Left, Right, Surround
Requirement : < -25 dB

Test 14b :
Select track 6 :
For 1 kHz in Surround channel and measure the crosstalk in Left, Center, Right
Requirement : < -25 dB

Inputs overload test (headroom to visible clipping)

General :
Before starting these tests set Master Volume -15 dB lower to make a new output reference (1W on loudresistors).
Requirement : check on scope for no visible signal clipping or measure THD <1,5 %

Test 15 :
Select track 7 :
Check the Left output signal between 20 Hz ... 20 kHz

Test 16 :
Select track 8 :
Check the Right output signal between 20 Hz ... 20 kHz

Test 17 :
Select track 9 :
Check the Center output signal
CENTER "NORMAL" between 100 Hz ... 20 kHz
CENTER "WIDE" between 20 Hz ... 20 kHz

Test 18 :
Select track 11 :
Check the Surround output signal between 50 Hz ... 7 kHz

Test 19 :*Center Mode Check*
Select Center "Normal" mode
a - Select track 5 at 1 kHz :
Adjust the Center output again with master volume for 1W output as 0 dB reference.
b - Select on track 5 the 100 Hz :
Signal to check the roll-off behaviour at -3 dB on the Center output
c - Select on track 5 the 50 Hz :
Signal and measure on the Left and Right output channels.
The lost 50 Hz signal on the Center output is equally splitted and added to the L and R channels.

Test 20 : *Center Mode Check*
Select Center "wide" mode (if exists)
Repeat test 19 a,b and c
The difference is no roll off behaviour at 100 Hz (Center) and no splitted bass (50 Hz signal) added to L and R channel.

Test 21 : *Center Mode Check*

Select Center mode phantom

Select track 5 (20 Hz ... 20 kHz) :

No output signals on the Center output or at least minimum -40 dB related to 1W outputs.

Measure now on the Left and Right output channels : the lost Center signals are equally splitted and added to these left and right channels (- 3 dB)

Test 22 : *3 CH mode control*

Select track 6 (100 Hz ... 7 kHz):

No output signals on the Surround output channel or at least minimum -40 dB related to 1W output.

Measure now at the Left and Right output channels : the lost Surround signals are equally splitted and added to the Left and Right output channels (-3 dB)

Test 23 : *2 CH mode control (stereo)*

Select track 5 :

No output on Centre output channel

Select track 6 :

No output on Surround output channel

Test 24 : *Time delay control in Surround channel*

- Principle description encoded burst signal spots (see fig. 1)

  1- Tone burst 1 kHz during 1 msec with interval time at 20 msec are given at the same time to the L_t; R_t inputs (in phase 0°)

  2- The next tone burst is given at the same time to the L_t R_t input, but in reverse phase to the R_t input (180°).

  These 2 tone bursts are repeated continuously during 2 minutes.
- Principle description decoded signal spots in Center/Surround channel
  - In case of 20 msec time delay mode the results are shown in fig. 1 in Center and Surround channel.

    The center spots in Center channel can be used as "Marker" spots (trigger signal) → repeated every 40 msec.

    The delayed surround spots occur at the same time as the center spots (markers)
  - When time delay mode is changed to 15 msec the delayed surround spots move to the left with respect to the centre mark spots.
  - When time delay mode is changed to 25 msec or 30 msec the delayed surround spots move to the right with respect to the center spots.
  - In case of no time delay ! (faulty condition) the surround spots fall just between 2 center markers spots (20 msec)
- **How to check with a double beam scope**

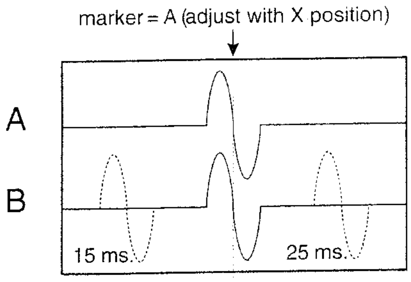
WARNING: Be sure that the ground connection (-) of each instrument is not connecteded with the safety earth ⊥ connection. To avoid damage to output amplifiers (balance type) Use only cinch (input) ground connection

- Select Pro Logic mode "wide" or "normal" (phantom in case of no Center output.)
- Select 20 msec time delay in Surround channel.
- Adjust scope at 5 msec/division and trigger at A input
- Connect input A to Center channel (or L or R in case of phantom mode)
- Connect input B to Surround channel
- Adjust trigger level and the X position to set pulse A in the middle of the scope . see fig.2 (if L or R used in phantom mode choose the largest (amplitude) pulse. see fig 3

  Select track 24:

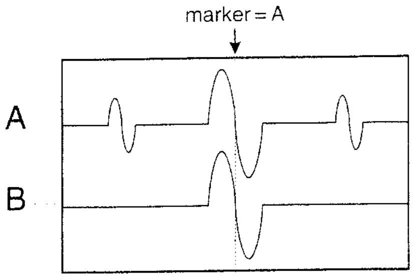
  Pulse A = 20 msec marker

  Pulse B = delayed surround signal pulse



20 msec. time delay

Fig. 2



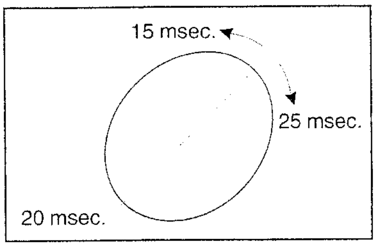
20 msec. in case of phantom mode

Fig. 3

Change time delay to 15 msec (only in versions with variable delay).
he surround pulse in channel B moves to the left with respect to side from center marker (channel A) position.
Change time delay to 25 or 30 msec (versions with variable delay).
The surround pulse in channel B moves to the right with respect to center marker (channel A) position.

Time delay with track 6

Alternative methode :
The functional operation of the time delay can be made visible with a lisajous figure, with an single beam scope.
Connect X-direction on Surround output
Connect Y-direction on Left or Right output/input.
Note : be careful and use only 1 ground connected to scope.
Select track 6 (surround test) :
Make the lisajous figure visible on the scope (amplitude adjust) see fig. 4



Lisajous out of phase
Time delay = OK

Fig. 4

Note : in sets with variable time delay the ellipse of the lisajous figure must be always open. Changing the time delay changes the direction of the circle accordingly.

Tone burst to check time delay in Surround channel

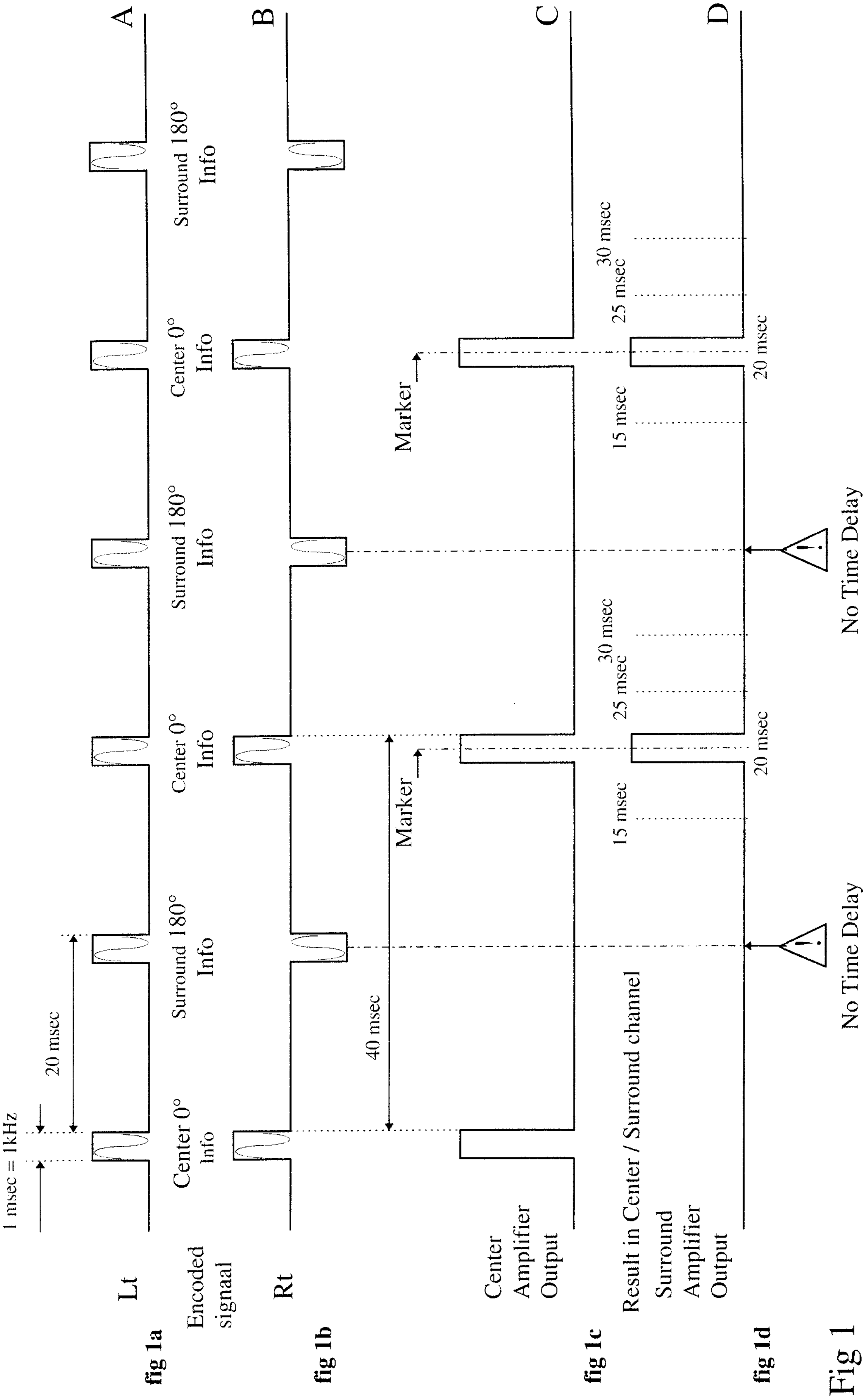
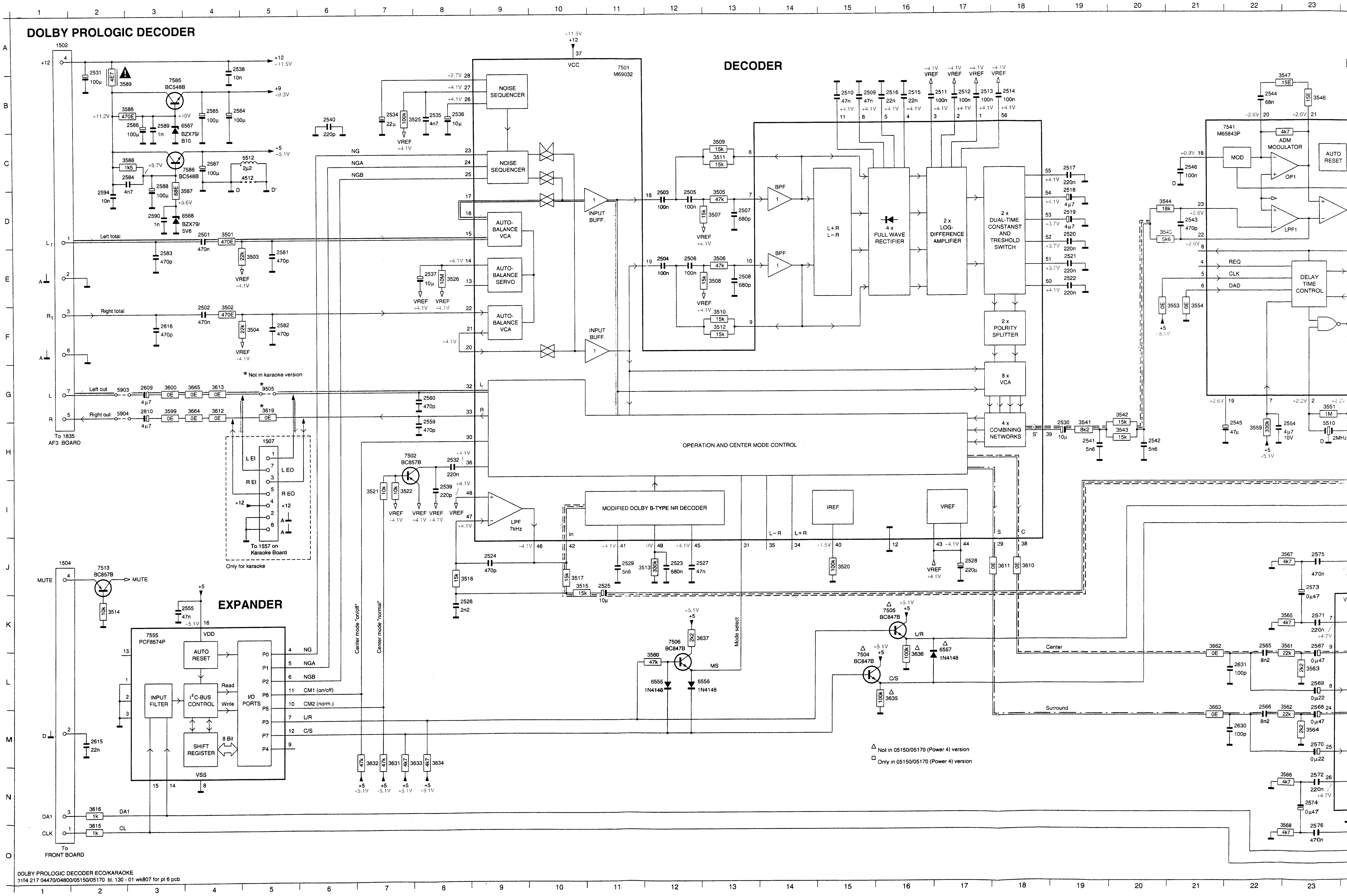
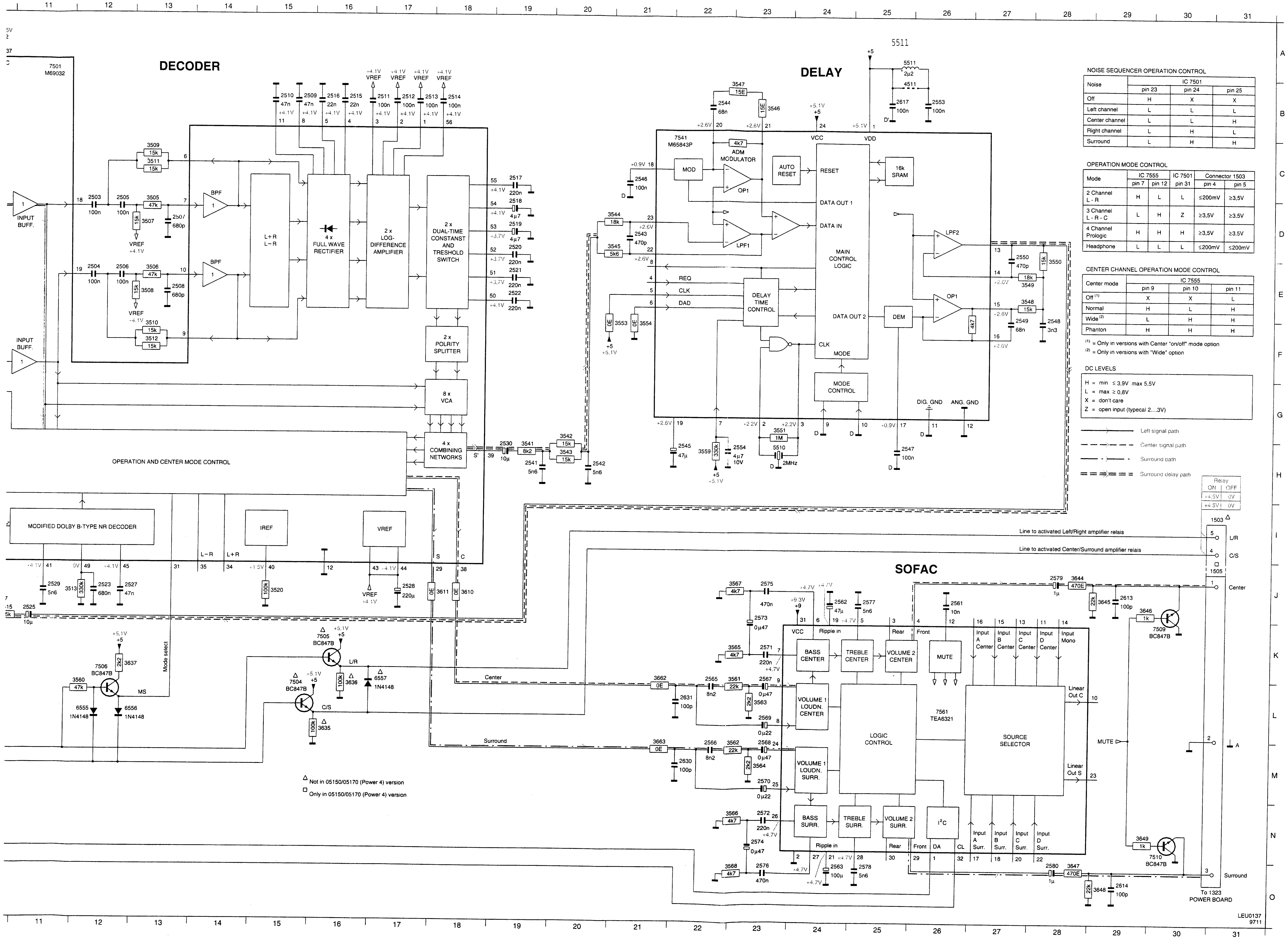


fig 1a
Lt
Encoded signaal
fig 1b
Rt
Center Amplifier Output
fig 1c
Result in Center / Surround channel
Surround Amplifier Output
fig 1d
A
B
C
D
1 msec = 1kHz
20 msec
40 msec
Center 0° Info
Surround 180° Info
Center 0° Info
Surround 180° Info
Center 0° Info
Surround 180° Info
Marker
Marker
15 msec
20 msec
25 msec
30 msec
15 msec
20 msec
25 msec
30 msec
No Time Delay
No Time Delay

Fig 1


DOLBY PROLOGIC DECODER
DECODER
EXPANDER
1502
+12
Lt
Left total
Rt
Right total
L
Left out
R
Right out
To 1835
AF3 BOARD
7585
BC548B
7586
BC548B
6567
BZX79/
B10
6568
BZX79/
5V6
3589
5512
2μ2
4512
7501
M69032
VCC
NOISE SEQUENCER
AUTO-BALANCE VCA
AUTO-BALANCE SERVO
INPUT BUFF.
NG
NGA
NGB
BPF
L+R
L−R
4 x
FULL WAVE
RECTIFIER
2 x
LOG-
DIFFERENCE
AMPLIFIER
2 x
DUAL-TIME
CONSTANST
AND
TRESHOLD
SWITCH
2 x
POLRITY
SPLITTER
8 x
VCA
4 x
COMBINING
NETWORKS
OPERATION AND CENTER MODE CONTROL
MODIFIED DOLBY B-TYPE NR DECODER
IREF
VREF
LPF
7kHz
7502
BC857B
* Not in karaoke version
9505
1507
L EI
R EI
L EO
R EO
To 1557 on
Karaoke Board
Only for karaoke
1504
MUTE
7513
BC857B
7555
PCF8574P
VDD
VSS
AUTO RESET
INPUT FILTER
I²C-BUS CONTROL
Read
Write
SHIFT REGISTER
8 Bit
I/O PORTS
CM1 (on/off)
CM2 (norm.)
L/R
C/S
Center mode "on/off"
Center mode "normal"
Mode select
7506
BC847B
7505
BC847B
7504
BC847B
6555
1N4148
6556
1N4148
6557
1N4148
MS
Center
Surround
DA1
CLK
CL
To
FRONT BOARD
7541
M65843P
MOD
ADM
MODULATOR
OP1
LPF1
AUTO
RESET
REQ
CLK
DAD
DELAY
TIME
CONTROL
2MHz
△ Not in 05150/05170 (Power 4) version
□ Only in 05150/05170 (Power 4) version

DOLBY PROLOGIC DECODER ECO/KARAOKE
3104 217 04470/04800/05150/05170 bl. 130 - 01 wk807 for pt 6 pcb


DECODER
7501
M69032
INPUT BUFF.
BPF
L+R
L−R
4 x FULL WAVE RECTIFIER
2 x LOG-DIFFERENCE AMPLIFIER
2 x DUAL-TIME CONSTANST AND TRESHOLD SWITCH
2 x POLRITY SPLITTER
8 x VCA
4 x COMBINING NETWORKS
OPERATION AND CENTER MODE CONTROL
MODIFIED DOLBY B-TYPE NR DECODER
IREF
VREF
DELAY
7541
M65843P
MOD
ADM MODULATOR
OP1
LPF1
AUTO RESET
RESET
16k SRAM
DATA OUT 1
DATA IN
MAIN CONTROL LOGIC
DELAY TIME CONTROL
REQ
CLK
DAD
DATA OUT 2
DEM
LPF2
MODE CONTROL
MODE
VCC
VDD
DIG. GND
ANG. GND
SOFAC
7561
TEA6321
BASS CENTER
TREBLE CENTER
VOLUME 2 CENTER
MUTE
VOLUME 1 LOUDN. CENTER
LOGIC CONTROL
SOURCE SELECTOR
VOLUME 1 LOUDN. SURR.
BASS SURR.
TREBLE SURR.
VOLUME 2 SURR.
I²C
Ripple in
Rear
Front
Input A Center
Input B Center
Input C Center
Input D Center
Input Mono
Input A Surr.
Input B Surr.
Input C Surr.
Input D Surr.
Linear Out C
Linear Out S
MUTE
DA
CL
Line to activated Left/Right amplifier relais
Line to activated Center/Surround amplifier relais
L/R
C/S
Center
Surround
1503
1505
To 1323 POWER BOARD
7505 BC847B
7504 BC847B
7506 BC847B
7509 BC847B
7510 BC847B
6555 1N4148
6556 1N4148
6557 1N4148
Mode select
MS
Relay
ON
OFF
+4.5V
0V
+4.5V
0V
△ Not in 05150/05170 (Power 4) version
□ Only in 05150/05170 (Power 4) version
LEU0137
9711

NOISE SEQUENCER OPERATION CONTROL

Noise	IC 7501		
	pin 23	pin 24	pin 25
Off	H	X	X
Left channel	L	L	L
Center channel	L	L	H
Right channel	L	H	L
Surround	L	H	H

OPERATION MODE CONTROL

Mode	IC 7555		IC 7501	Connector 1503	
	pin 7	pin 12	pin 31	pin 4	pin 5
2 Channel L - R	H	L	L	≤200mV	≥3,5V
3 Channel L - R - C	L	H	Z	≥3,5V	≥3,5V
4 Channel Prologic	H	H	H	≥3,5V	≥3,5V
Headphone	L	L	L	≤200mV	≤200mV

CENTER CHANNEL OPERATION MODE CONTROL

Center mode	IC 7555		
	pin 9	pin 10	pin 11
Off (1)	X	X	L
Normal	H	L	H
Wide (2)	L	H	H
Phanton	H	H	H

(1) = Only in versions with Center "on/off" mode option

(2) = Only in versions with "Wide" option

DC LEVELS

H = min ≤ 3,9V max 5,5V

L = max ≥ 0,8V

X = don't care

Z = open input (typecal 2....3V)

Left signal path

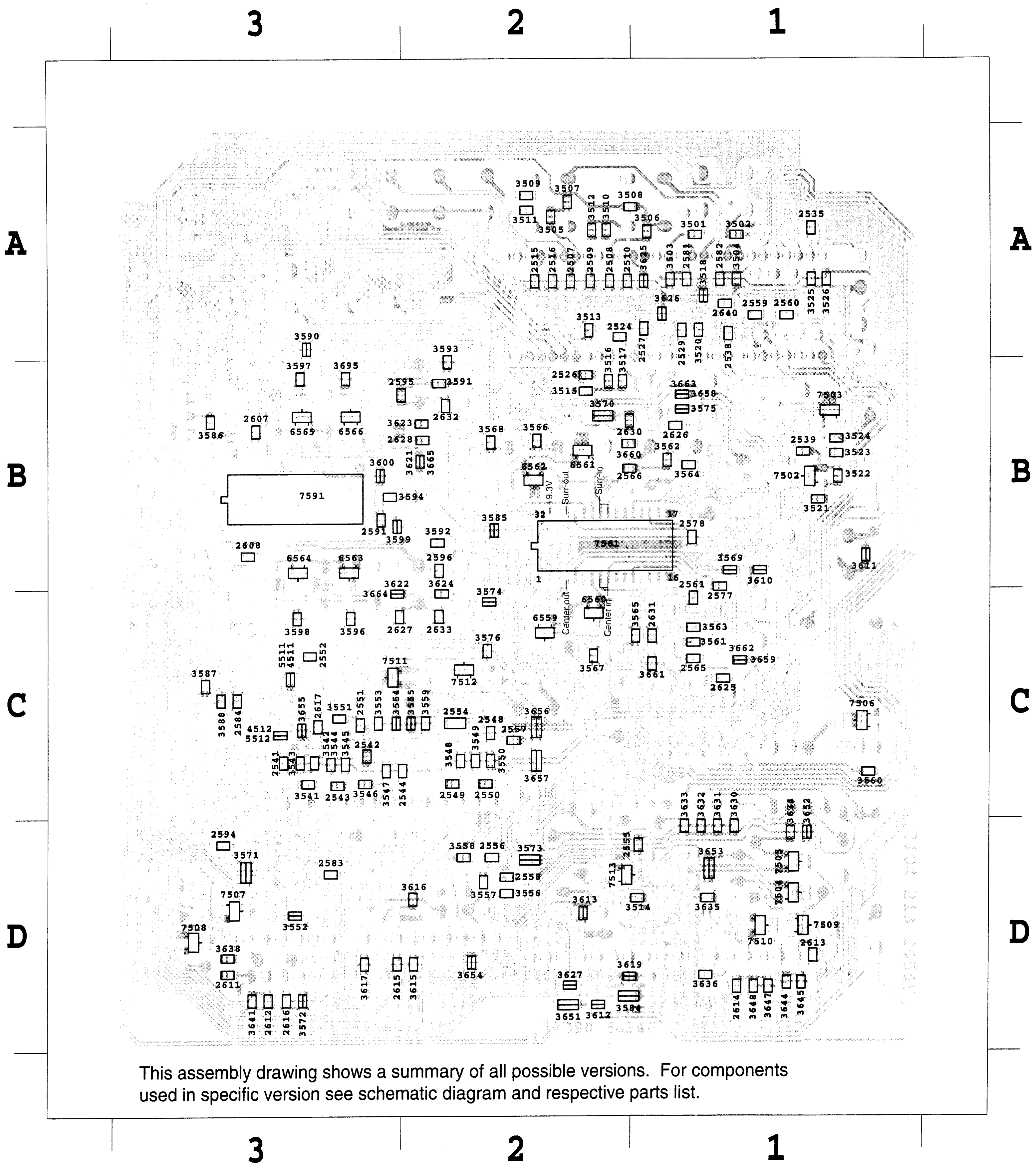
Center signal path

Surround path

Surround delay path

1502	A1
1503	I30
1504	J1
1505	J30
1507	H5
2501	D4
2502	F4
2503	D12
2504	E12
2505	D12
2506	E12
2507	D13
2508	E13
2509	B15
2510	B15
2511	B17
2512	B17
2513	B17
2514	B18
2515	B16
2516	B16
2517	C19
2518	D19
2519	D19
2520	D19
2521	E19
2522	E19
2523	J12
2524	J9
2525	J11
2526	K8
2527	J12
2528	J17
2529	J11
2530	H19
2531	A2
2532	H8
2534	B7
2535	B8
2536	B8
2537	E8
2538	A4
2539	I8
2540	B6
2541	H19
2542	H20
2543	D21
2544	B22
2545	H22
2546	C21
2547	H25
2548	F28
2549	F27
2550	D27
2553	B26
2554	H23
2555	K4
2559	H8
2560	G8
2561	J26
2562	J24
2563	O24
2564	B4
2565	L22
2566	M22
2567	L23
2568	M23
2569	L23
2570	M23
2571	K23
2572	N23
2573	K23
2574	N23
2575	J23
2576	O23
2577	J25
2578	O25
2579	J28
2580	O28
2581	E5
2582	F5
2583	E3
2584	C2
2585	B4
2586	B3
2587	C4
2588	C3
2589	B3
2590	D3
2594	D2
2609	G3
2610	G3
2613	J29
2614	O29
2615	M2
2616	F3
2617	B25
2630	M22
2631	L22
3501	D4
3502	F4
3503	E5
3504	F5
3505	D13
3506	E13
3507	D13
3508	E13
3509	C13
3510	F13
3511	C13
3512	F13
3513	J11
3514	K2
3515	J10
3516	J8
3517	J10
3520	J15
3521	I7
3522	I7
3525	B7
3526	E8
3541	H19
3542	H20
3543	H20
3544	D20
3545	D20
3546	B23
3547	B22
3548	E27
3549	E27
3550	E28
3551	G23
3553	F21
3554	F21
3559	H22
3560	L12
3561	L22
3562	M22
3563	L23
3564	M23
3565	K22
3566	N22
3567	J22
3568	O22
3586	B2
3587	D3
3588	C2
3589	B2
3599	G3
3600	G3
3610	J18
3611	J18
3612	G4
3613	G4
3615	O2
3616	N2
3619	G5
3631	N7
3632	N7
3633	N7
3634	N8
3635	L16
3636	L16
3637	K12
3644	J28
3645	J29
3646	J29
3647	O28
3648	O29
3649	N29
3662	L21
3663	M21
3664	G4
3665	G4
4511	B25
4512	C5
5510	H23
5511	A25
5512	C5
5903	G2
5904	G2
6555	L12
6556	L12
6557	L17
6567	B3
6568	D3
7501	A11
7502	H7
7504	L15
7505	K16
7506	K12
7509	K30
7510	N30
7513	J2
7541	C21
7555	K3
7561	L26
7585	B3
7586	C3
9505	G5

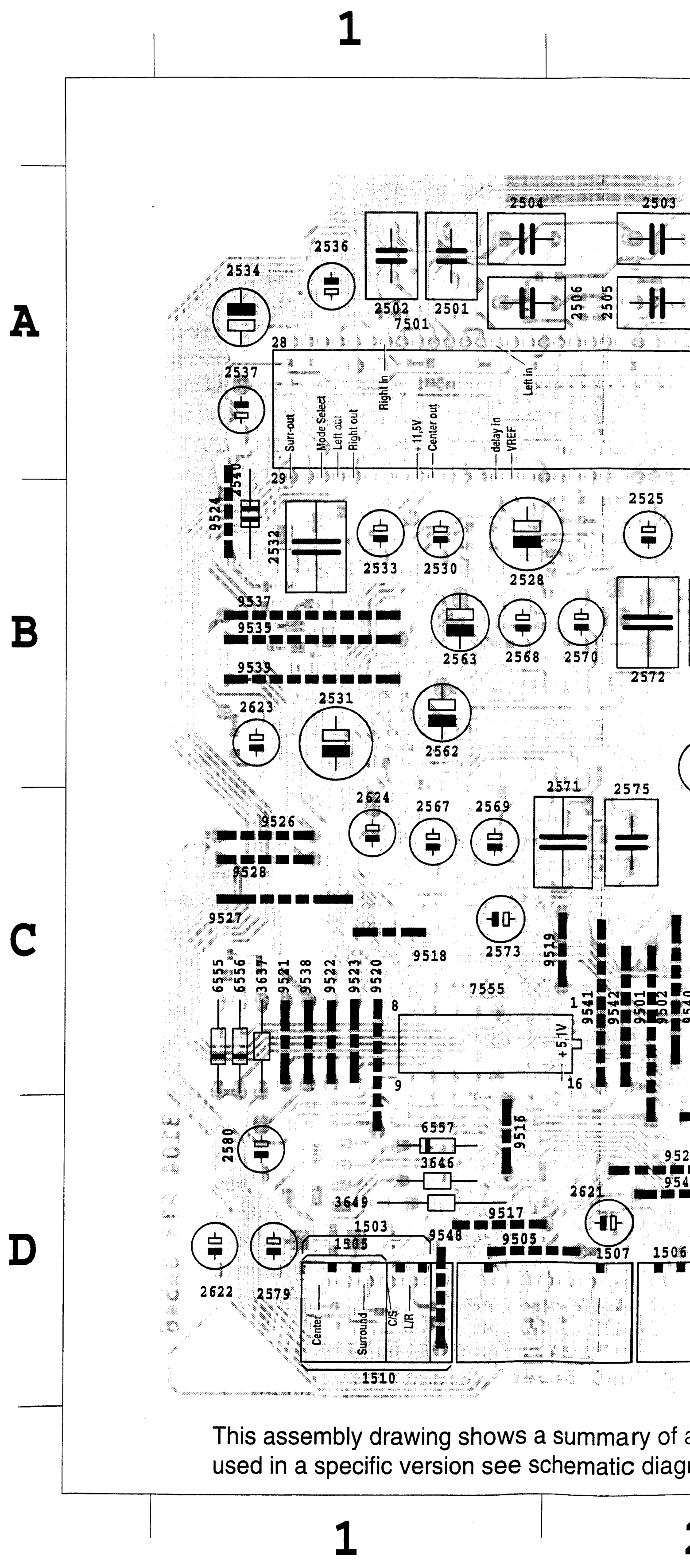
CHIP LAYOUT



This assembly drawing shows a summary of all possible versions. For components used in specific version see schematic diagram and respective parts list.

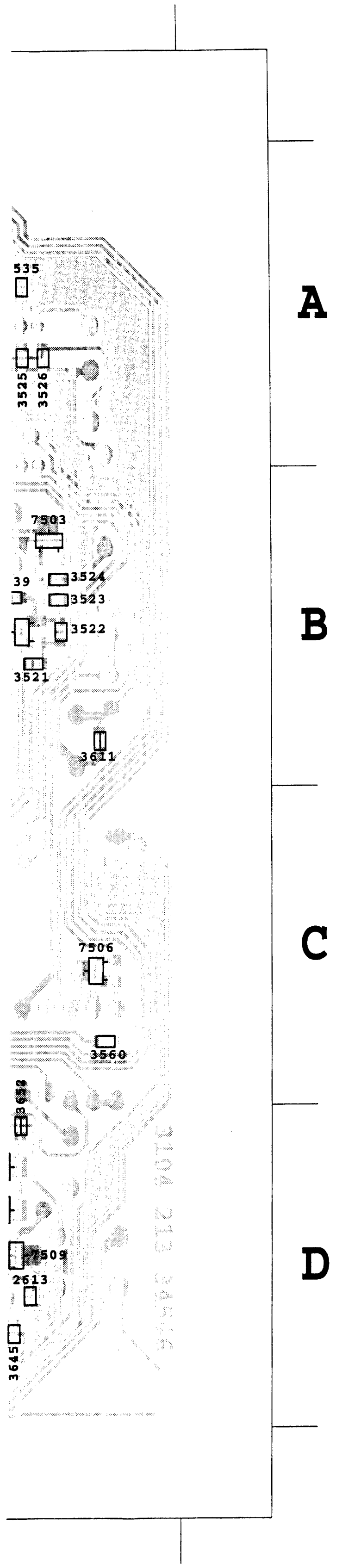
2507	A	2
2508	A	2
2509	A	2
2510	A	2
2515	A	2
2516	A	2
2524	A	2
2526	B	2
2527	A	1
2529	A	1
2535	A	1
2538	A	1
2539	B	1
2541	C	3
2542	C	3
2543	C	3
2544	C	2
2548	C	2
2549	C	2
2550	C	2
2551	C	3
2552	C	3
2554	C	2
2555	D	1
2556	D	2
2557	C	2
2558	D	2
2559	A	1
2560	A	1
2561	C	1
2565	C	1
2566	B	2
2577	B	1
2578	B	1
2581	A	1
2582	A	1
2583	D	3
2584	C	3
2591	B	3
2594	D	3
2595	B	3
2596	B	2
2607	B	3
2608	B	3
2611	D	3
2612	D	3
2613	D	1
2614	D	1
2615	D	3
2616	D	3
2617	C	3
2625	C	1
2626	B	1
2627	C	3
2628	B	2
2630	B	2
2631	C	1
2632	B	2
2633	C	2
2640	A	1
3501	A	1
3502	A	1
3503	A	1
3504	A	1
3505	A	2
3506	A	1
3507	A	2
3508	A	2
3509	A	2
3510	A	2
3511	A	2
3512	A	2
3513	A	2
3514	D	1
3515	B	2
3516	B	2
3517	B	2
3518	A	1
3520	A	1
3521	B	1
3522	B	1
3523	B	1
3524	B	1
3525	A	1
3526	A	1
3541	C	3
3542	C	3
3543	C	3
3544	C	3
3545	C	3
3546	C	3
3547	C	3
3548	C	2
3549	C	2
3550	C	2
3551	C	3
3552	D	3
3553	C	3
3554	C	3
3555	C	2
3556	D	2
3557	D	2
3558	D	2
3559	C	2
3560	C	1
3561	C	1
3562	B	1
3563	C	1
3564	B	1
3565	C	1
3566	B	2
3567	C	2
3568	B	2
3569	B	1
3570	B	2
3571	D	3
3572	D	3
3573	D	2
3574	C	2
3575	B	1
3576	C	2
3584	D	2
3585	B	2
3586	B	3
3587	C	3
3588	C	3
3590	A	3
3591	B	2
3592	B	2
3593	B	2
3594	B	3
3596	C	3
3597	B	3
3598	C	3
3599	B	3
3600	B	3
3610	B	1
3611	B	1
3612	D	2
3613	D	2
3615	D	2
3616	D	2
3617	D	3
3619	D	2
3621	B	2
3622	C	3
3623	B	2
3624	C	2
3625	A	1
3626	A	1
3627	D	2
3630	D	1
3631	D	1
3632	D	1
3633	D	1
3634	D	1
3635	D	1
3636	D	1
3638	D	3
3641	D	3
3644	D	1
3645	D	1
3647	D	1
3648	D	1
3651	D	2
3652	D	1
3653	D	1
3654	D	2
3655	C	3
3656	C	2
3657	C	2
3658	B	1
3659	C	1
3660	B	2
3661	C	1
3662	C	1
3663	B	1
3664	C	3
3665	B	2
3695	B	3
4511	C	3
4512	C	3
5511	C	3
5512	C	3
6559	C	2
6560	C	2
6561	B	2
6562	B	2
6563	B	3
6564	B	3
6565	B	3
6566	B	3
7502	B	1
7503	B	1
7504	D	1
7505	D	1
7506	C	1
7507	D	3
7508	D	3
7509	D	1
7510	D	1
7511	C	3
7512	C	2
7513	D	2
7561	B	2
7591	B	3

COMPONENT LAYOUT

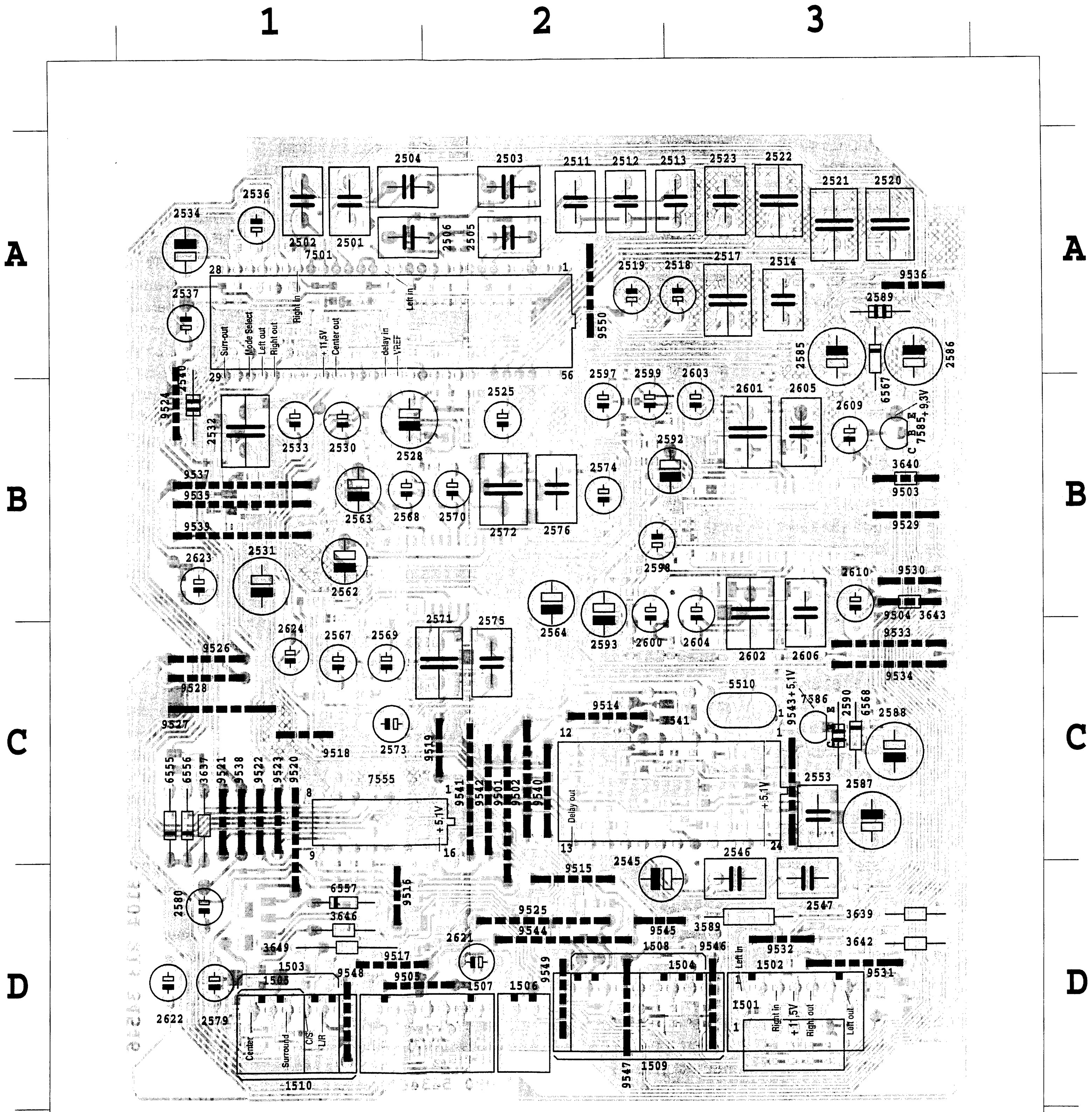


This assembly drawing shows a summary of a
used in a specific version see schematic diag

COMPONENT LAYOUT


A
B
C
D
535
3525
3526
7503
3524
3523
3522
3521
3611
7506
3560
3652
7509
2613
3645

2507	A	2	2633	C	2	3572	D	3	3661	C	1
2508	A	2	2640	A	1	3573	D	2	3662	C	1
2509	A	2	3501	A	1	3574	C	2	3663	B	1
2510	A	2	3502	A	1	3575	B	1	3664	C	3
2515	A	2	3503	A	1	3576	C	2	3665	B	2
2516	A	2	3504	A	1	3584	D	2	3695	B	3
2524	A	2	3505	A	2	3585	B	2	4511	C	3
2526	B	2	3506	A	1	3586	B	3	4512	C	3
2527	A	1	3507	A	2	3587	C	3	5511	C	3
2529	A	1	3508	A	2	3588	C	3	5512	C	3
2535	A	1	3509	A	2	3590	A	3	6559	C	2
2538	A	1	3510	A	2	3591	B	2	6560	C	2
2539	B	1	3511	A	2	3592	B	2	6561	B	2
2541	C	3	3512	A	2	3593	B	2	6562	B	2
2542	C	3	3513	A	2	3594	B	3	6563	B	3
2543	C	3	3514	D	1	3596	C	3	6564	B	3
2544	C	2	3515	B	2	3597	B	3	6565	B	3
2548	C	2	3516	B	2	3598	C	3	6566	B	3
2549	C	2	3517	B	2	3599	B	3	7502	B	1
2550	C	2	3518	A	1	3600	B	3	7503	B	1
2551	C	3	3520	A	1	3610	B	1	7504	D	1
2552	C	3	3521	B	1	3611	B	1	7505	D	1
2554	C	2	3522	B	1	3612	D	2	7506	C	1
2555	D	1	3523	B	1	3613	D	2	7507	D	3
2556	D	2	3524	B	1	3615	D	2	7508	D	3
2557	C	2	3525	A	1	3616	D	2	7509	D	1
2558	D	2	3526	A	1	3617	D	3	7510	D	1
2559	A	1	3541	C	3	3619	D	2	7511	C	3
2560	A	1	3542	C	3	3621	B	2	7512	C	2
2561	C	1	3543	C	3	3622	C	3	7513	D	2
2565	C	1	3544	C	3	3623	B	2	7561	B	2
2566	B	2	3545	C	3	3624	C	2	7591	B	3
2577	B	1	3546	C	3	3625	A	1			
2578	B	1	3547	C	3	3626	A	1			
2581	A	1	3548	C	2	3627	D	2			
2582	A	1	3549	C	2	3630	D	1			
2583	D	3	3550	C	2	3631	D	1			
2584	C	3	3551	C	3	3632	D	1			
2591	B	3	3552	D	3	3633	D	1			
2594	D	3	3553	C	3	3634	D	1			
2595	B	3	3554	C	3	3635	D	1			
2596	B	2	3555	C	2	3636	D	1			
2607	B	3	3556	D	2	3638	D	3			
2608	B	3	3557	D	2	3641	D	3			
2611	D	3	3558	D	2	3644	D	1			
2612	D	3	3559	C	2	3645	D	1			
2613	D	1	3560	C	1	3647	D	1			
2614	D	1	3561	C	1	3648	D	1			
2615	D	3	3562	B	1	3651	D	2			
2616	D	3	3563	C	1	3652	D	1			
2617	C	3	3564	B	1	3653	D	1			
2625	C	1	3565	C	1	3654	D	2			
2626	B	1	3566	B	2	3655	C	3			
2627	C	3	3567	C	2	3656	C	2			
2628	B	2	3568	B	2	3657	C	2			
2630	B	2	3569	B	1	3658	B	1			
2631	C	1	3570	B	2	3659	C	1			
2632	B	2	3571	D	3	3660	B	2			


1
2
3
A
B
C
D
2504
2503
2511
2512
2513
2523
2522
2521
2520
2534
2536
2502
2501
2506
2505
7501
28
1
Surr-out
Mode Select
Left out
Right out
Right in
+11.5V
Center out
delay in
VREF
Left in
29
56
2519
2518
2517
2514
9536
2589
9550
2537
2585
2586
6567
2540
9524
2532
2533
2530
2528
2525
2597
2599
2603
2601
2605
2609
7585
+3.3V
2592
2574
3640
9503
9537
9535
9539
2563
2568
2570
2572
2576
2598
9529
2623
2531
2562
2610
9530
9504
3643
2624
2567
2569
2571
2575
2564
2593
2600
2604
2602
2606
9533
9534
9526
9528
9527
5510
+5.1V
7586
2590
6568
2588
9514
9541
2573
9518
9519
6555
6556
3637
9521
9538
9522
9523
9520
7555
8
9
16
9501
9502
9540
12
13
24
Delay out
2553
2587
2546
2547
9515
2545
9516
6557
3646
9525
3639
3642
2580
3649
2621
9545
9544
3589
9546
9532
9531
1503
1505
9548
9517
9505
1507
1506
9549
1508
1504
1502
1501
Left in
Right in
Right out
Left out
2622
2579
Center
Surround
C/S
L/R
1510
9547
1509

This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

1501	D	3	2587	C	3	9527	C	1
1502	D	3	2588	C	3	9528	C	1
1503	D	1	2589	A	3	9529	B	3
1504	D	3	2590	C	3	9530	B	3
1505	D	1	2592	B	3	9531	D	3
1506	D	2	2593	B	2	9532	D	3
1507	D	2	2597	B	2	9533	C	3
1508	D	2	2598	B	2	9534	C	3
1509	D	2	2599	B	2	9535	B	1
1510	D	1	2600	B	2	9536	A	3
2501	A	1	2601	B	3	9537	B	1
2502	A	1	2602	B	3	9538	C	1
2503	A	2	2603	B	3	9539	B	1
2504	A	1	2604	B	3	9540	C	2
2505	A	2	2605	B	3	9541	C	2
2506	A	1	2606	B	3	9542	C	2
2511	A	2	2609	B	3	9543	C	3
2512	A	2	2610	B	3	9544	D	2
2513	A	3	2621	D	2	9545	D	2
2514	A	3	2622	D	1	9546	D	3
2517	A	3	2623	B	1	9547	D	2
2518	A	3	2624	C	1	9548	D	1
2519	A	2	3589	D	3	9549	D	2
2520	A	3	3637	C	1	9550	A	2
2521	A	3	3639	D	3			
2522	A	3	3640	B	3			
2523	A	3	3642	D	3			
2525	B	2	3643	B	3			
2528	B	1	3646	D	1			
2530	B	1	3649	D	1			
2531	B	1	5510	C	3			
2532	B	1	6555	C	1			
2533	B	1	6556	C	1			
2534	A	1	6557	D	1			
2536	A	1	6567	A	3			
2537	A	1	6568	C	3			
2540	B	1	7501	A	1			
2545	D	2	7541	C	3			
2546	D	3	7555	C	1			
2547	D	3	7585	B	3			
2553	C	3	7586	C	3			
2562	B	1	9501	C	2			
2563	B	1	9502	C	2			
2564	B	2	9503	B	3			
2567	C	1	9504	B	3			
2568	B	1	9505	D	1			
2569	C	1	9514	C	2			
2570	B	2	9515	D	2			
2571	C	2	9516	D	1			
2572	B	2	9517	D	1			
2573	C	1	9519	C	2			
2574	B	2	9520	C	1			
2575	C	2	9521	C	1			
2576	B	2	9522	C	1			
2579	D	1	9523	C	1			
2580	D	1	9524	B	1			
2585	A	3	9525	D	2			
2586	A	3	9526	C	1			

ELECTRICAL PARTS LIST - DOLBY PRO-LOGIC BOARD

CAPACITORS

2501	4822 121 51252	470nF 5% 63V
2502	4822 121 51252	470nF 5% 63V
2503	5322 121 42386	100nF 5% 63V
2504	5322 121 42386	100nF 5% 63V
2505	5322 121 42386	100nF 5% 63V
2506	5322 121 42386	100nF 5% 63V
2507	4822 122 32535	680pF 10% 63V
2508	4822 122 32535	680pF 10% 63V
2509	4822 126 12944	47nF 10% 50V
2510	4822 126 12944	47nF 10% 50V
2511	5322 121 42386	100nF 5% 63V
2512	5322 121 42386	100nF 5% 63V
2513	5322 121 42386	100nF 5% 63V
2514	5322 121 42386	100nF 5% 63V
2515	5322 122 32654	22nF 10% 63V
2516	5322 122 32654	22nF 10% 63V
2517	4822 121 42408	220nF 5% 63V
2518	4822 124 40246	4,7µF 20% 63V
2519	4822 124 40246	4,7µF 20% 63V
2520	4822 121 42408	220nF 5% 63V
2521	4822 121 42408	220nF 5% 63V
2522	4822 121 42408	220nF 5% 63V
2523	5322 121 42498	680nF 5% 63V
2524	5322 122 34099	470pF 10% 63V
2525	4822 124 41579	10µF 20% 50V
2526	4822 122 33175	2,2nF 20% 50V
2527	4822 126 12944	47nF 10% 50V
2528	4822 124 40196	220µF 20% 16V
2529	4822 122 32646	5,6nF 10% 50V
2530	4822 124 41579	10µF 20% 50V
2531	4822 124 81029	100µF 20% 25V
2532	4822 121 42408	220nF 5% 63V
2534	4822 124 41596	22µF 20% 50V
2535	5322 126 10223	4,7nF 10% 63V
2536	4822 124 41579	10µF 20% 50V
2537	4822 124 41579	10µF 20% 50V
2538	4822 122 33177	10nF 10% 50V
2539	5322 126 10794	220pF 5% 63V
2540	4822 122 10466	220pF 10% 50V
2541	4822 122 32646	5,6nF 10% 50V
2542	4822 122 32646	5,6nF 10% 50V
2543	5322 122 34099	470pF 10% 63V
2544	4822 126 13805	68nF 10 16V
2545	4822 124 40433	47µF 20% 25V
2546	5322 121 42386	100nF 5% 63V
2547	5322 121 42386	100nF 5% 63V
2548	4822 122 33891	3,3nF 10% 63V
2549	4822 126 13805	68nF 10% 16V
2550	5322 122 34099	470pF 10% 63V
2553	5322 121 42386	100nF 5% 63V
2554	4822 126 14083	4,7µF +80/-20% 10V
2555	4822 126 12944	47nF 10% 50V
2559	5322 122 34099	470pF 10% 63V
2560	5322 122 34099	470pF 10% 63V
2561	4822 122 33177	10nF 20% 50V
2562	4822 124 40433	47µF 20% 25V
2563	4822 124 41584	100µF 20% 10V
2564	4822 124 41584	100µF 20% 10V
2565	4822 122 33336	8,2nF 10% 50V
2566	4822 122 33336	8,2nF 10% 50V
2567	4822 124 41407	0,47µF 20% 63V
2568	4822 124 41407	0,47µF 20% 63V
2569	4822 124 40746	0,22µF 20% 63V
2570	4822 124 40746	0,22µF 20% 63V
2571	4822 121 42408	220nF 5% 63V
2572	4822 121 42408	220nF 5% 63V
2573	4822 124 41407	0,47µF 20% 63V
2574	4822 124 41407	0,47µF 20% 63V
2575	4822 121 51252	470nF 5% 63V
2576	4822 121 51252	470nF 5% 63V
2577	4822 122 32646	5,6nF 10% 50V
2578	4822 122 32646	5,6nF 10% 50V
2579	4822 124 40242	1µF 20% 63V
2580	4822 124 40242	1µF 20% 63V
2581	5322 122 34099	470pF 10% 63V
2582	5322 122 34099	470pF 10% 63V
2583	5322 122 34099	470pF 10% 63V
2584	5322 126 10223	4,7nF 10% 63V
2585	4822 124 81029	100µF 20% 25V
2586	4822 124 81029	100µF 20% 25V
2587	4822 124 81029	100µF 20% 25V
2588	4822 124 81029	100µF 20% 25V
2589	4822 122 33197	1nF 10% 50V
2590	4822 122 33197	1nF 10% 50V
2594	4822 122 33177	10nF 10% 50V
2609	4822 124 40246	4,7µF 20% 63V
2610	4822 124 40246	4,7µF 20% 63V
2613	5322 122 32531	100pF 5% 50V
2614	5322 122 32531	100pF 5% 50V
2615	5322 122 32654	22nF 10% 63V
2616	5322 122 34099	470pF 10% 63V
2617	4822 126 13296	100nF 10% 16V
2630	5322 122 32531	100pF 5% 50V
2631	5322 122 32531	100pF 5% 50V

RESISTORS

3501	4822 051 20471	470R 5% 0,1W
3502	4822 051 20471	470R 5% 0,1W
3503	4822 051 20223	22k 5% 0,1W
3504	4822 051 20223	22k 5% 0,1W
3505	4822 051 20473	47k 5% 0,1W
3506	4822 051 20473	47k 5% 0,1W
3507	4822 051 20153	15k 5% 0,1W
3508	4822 051 20153	15k 5% 0,1W
3509	4822 051 20153	15k 5% 0,1W
3510	4822 051 20153	15k 5% 0,1W
3511	4822 051 20153	15k 5% 0,1W
3512	4822 051 20153	15k 5% 0,1W
3513	4822 051 20334	330k 5% 0,1W
3514	4822 117 10833	10k 1% 0,1W
3515	4822 051 20153	15k 5% 0,1W
3516	4822 051 20153	15k 5% 0,1W
3517	4822 051 20153	15k 5% 0,1W
3518	4822 051 20008	0R Jumper 0805
3520	4822 051 20104	100k 5% 0,1W
3521	4822 117 10833	10k 1% 0,1W
3522	4822 117 10833	10k 1% 0,1W
3525	4822 051 20104	100k 5% 0,1W

ELECTRICAL PARTS LIST - DOLBY PRO-LOGIC BOARD

3526	4822 051 20106	10M 5% 0,1W
3541	4822 051 20822	8k2 5% 0,1W
3542	4822 051 20153	15k 5% 0,1W
3543	4822 051 20153	15k 5% 0,1W
3544	4822 051 20183	18k 5% 0,1W
3545	4822 051 20562	5k6 5% 0,1W
3546	4822 051 20159	15R 5% 0,1W
3547	4822 051 20159	15R 5% 0,1W
3548	4822 051 20153	15k 5% 0,1W
3549	4822 051 20183	18k 5% 0,1W
3550	4822 051 20153	15k 5% 0,1W
3551	4822 051 20105	1M 5% 0,1W
3552	4822 051 20008	0R Jumper 0805
3553	4822 051 20008	0R Jumper 0805
3554	4822 051 20008	0R Jumper 0805
3559	4822 051 20334	330k 5% 0,1W
3560	4822 051 20473	47k 5% 0,1W
3561	4822 051 20223	22k 5% 0,1W
3562	4822 051 20223	22k 5% 0,1W
3563	4822 117 11449	2k2 1% 0,1W
3564	4822 117 11449	2k2 1% 0,1W
3565	4822 051 20472	4k7 5% 0,1W
3566	4822 051 20472	4k7 5% 0,1W
3567	4822 051 20472	4k7 5% 0,1W
3568	4822 051 20472	4k7 5% 0,1W
3570	4822 051 10008	0R Jumper 1206
3571	4822 051 10008	0R Jumper 1206
3572	4822 051 20008	0R Jumper 0805
3573	4822 051 10008	0R Jumper 1206
3574	4822 051 20008	0R Jumper 0805
3584	4822 051 10008	0R Jumper 1206
3585	4822 051 20008	0R Jumper 0805
3586	4822 051 20471	470R 5% 0,1W
3587	4822 051 20689	68R 5% 0,1W
3588	4822 117 11139	1k5 1% 0,1W
3589	4822 052 10478	⚠ 4R7 5% 0,33W
3590	4822 051 20008	0R Jumper 0805
3599	4822 051 20008	0R Jumper 0805
3600	4822 051 20008	0R Jumper 0805
3610	4822 051 20008	0R Jumper 0805
3611	4822 051 20008	0R Jumper 0805
3612	4822 051 20008	0R Jumper 0805
3613	4822 051 20008	0R Jumper 0805
3615	4822 051 10102	1k 2% 0,25W
3616	4822 051 10102	1k 2% 0,25W
3619	4822 051 20008	0R Jumper 0805
3625	4822 051 20008	0R Jumper 0805
3626	4822 051 20008	0R Jumper 0805
3627	4822 051 20008	0R Jumper 0805
3631	4822 051 20473	47k 5% 0,1W
3632	4822 051 20473	47k 5% 0,1W
3633	4822 051 20472	4k7 5% 0,1W
3634	4822 051 20472	4k7 5% 0,1W
3635	4822 051 20104	100k 5% 0,1W
3636	4822 051 20104	100k 5% 0,1W
3637	4822 116 52256	2k2 5% 0,5W
3644	4822 051 20471	470R 5% 0,1W
3645	4822 051 20223	22k 5% 0,1W
3646	4822 050 11002	1k 1% 0,4W
3647	4822 051 20471	470R 5% 0,1W
3648	4822 051 20223	22k 5% 0,1W
3649	4822 050 11002	1k 1% 0,4W
3651	4822 051 10008	0R Jumper 1206
3652	4822 051 20008	0R Jumper 0805)
3653	4822 051 10008	0R Jumper 1206
3654	4822 051 20008	0R Jumper 0805
3655	4822 051 20008	0R Jumper 0805
3656	4822 051 10008	0R Jumper 1206
3657	4822 051 10008	0R Jumper 1206
3662	4822 051 20008	0R Jumper 0805
3663	4822 051 20008	0R Jumper 0805
3664	4822 051 20008	0R Jumper 0805
3665	4822 051 20008	0R Jumper 0805
5465	4822 051 20008	0R Jumper 0805

COILS & FILTERS

5510	4822 242 81525	Ceram Resonator 2MHz
5511	4822 157 10586	Coil 2,2µH 10%
5512	4822 157 10586	Coil 2,2µH 10%

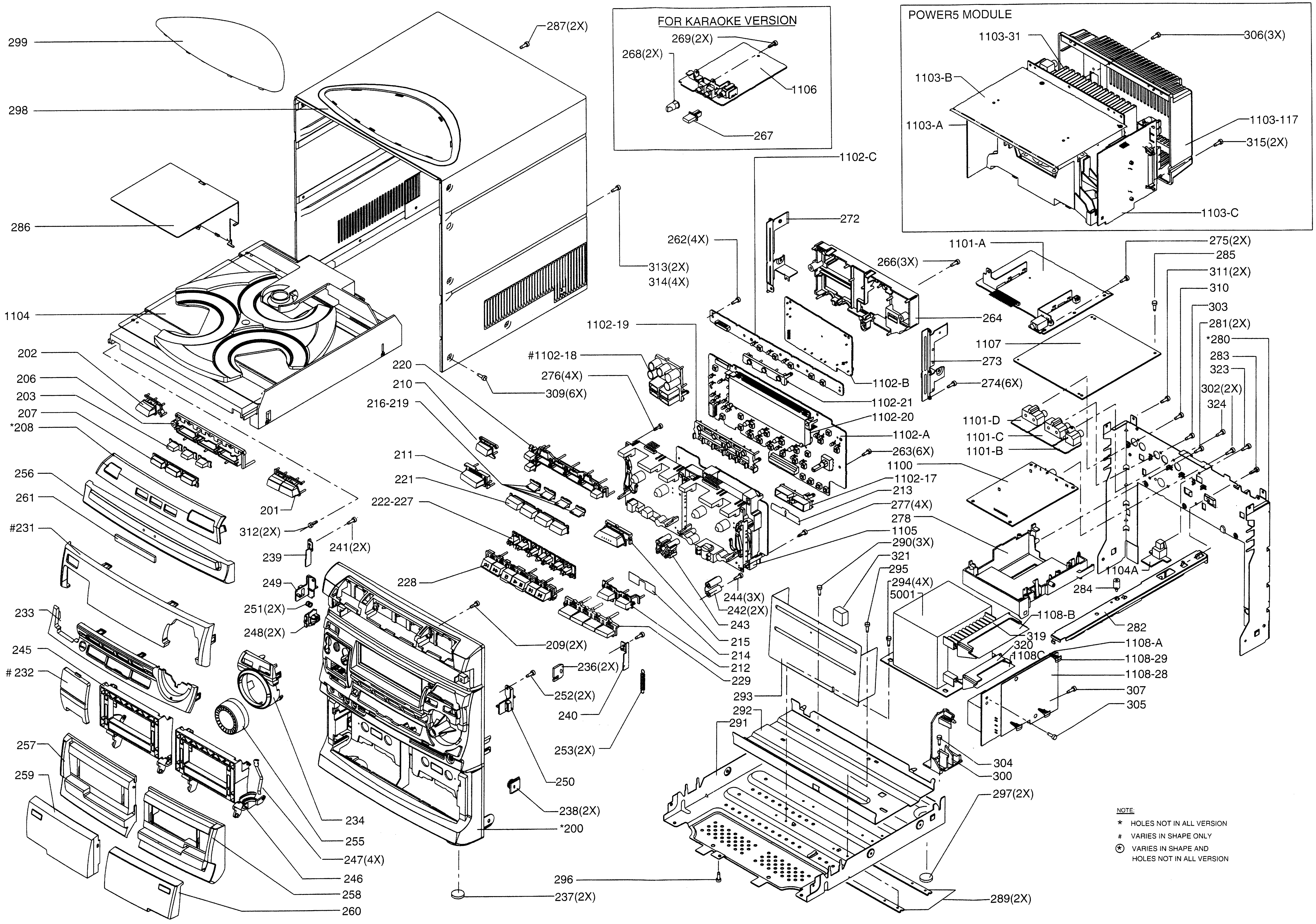
DIODES

6555	4822 130 30621	1N4148
6556	4822 130 30621	1N4148
6557	4822 130 30621	1N4148
6567	4822 130 61219	BZX79-B10
6568	4822 130 34173	BZX79-C5V6

TRANSISTORS & INTEGRATED CIRCUITS

7501	4822 209 12986	M69032P
7502	5322 130 60508	BC857B
7504	5322 130 60511	BC847B
7505	5322 130 60511	BC847B
7506	5322 130 60511	BC847B
7509	5322 130 60511	BC847B
7510	5322 130 60511	BC847B
7513	5322 130 60508	BC857B
7541	4822 209 15107	M65843AP
7555	5322 209 10883	PCF8574P
7561	4822 209 33652	TEA6321T/V1
7585	4822 130 40937	BC548B
7586	4822 130 40937	BC548B

NOTE: Only the parts mentioned in this list are normal service spare parts.


FOR KARAOKE VERSION
269(2X)
268(2X)
1106
267
POWER5 MODULE
1103-31
306(3X)
1103-B
1103-A
1103-117
315(2X)
1103-C
299
287(2X)
298
286
1104
313(2X)
314(4X)
1102-C
272
262(4X)
266(3X)
1101-A
275(2X)
285
311(2X)
310
303
281(2X)
*280
283
323
302(2X)
324
264
1102-19
#1102-18
276(4X)
309(6X)
1107
273
274(6X)
1102-B
1102-21
1102-20
1102-A
263(6X)
1101-D
1101-C
1101-B
1100
1102-17
213
277(4X)
278
1105
290(3X)
321
295
294(4X)
5001
1104A
284
1108-B
319
320
1108C
1108-A
1108-29
1108-28
282
307
305
304
300
297(2X)
289(2X)
296
237(2X)
*200
293
292
291
202
206
203
207
*208
256
261
#231
233
245
# 232
257
259
201
312(2X)
241(2X)
239
249
251(2X)
248(2X)
220
210
216-219
211
221
222-227
228
209(2X)
236(2X)
252(2X)
240
253(2X)
250
238(2X)
244(3X)
242(2X)
243
215
214
212
229
234
255
247(4X)
246
258
260

NOTE:
- * HOLES NOT IN ALL VERSION
- # VARIES IN SHAPE ONLY
- ⊛ VARIES IN SHAPE AND HOLES NOT IN ALL VERSION

MECHANICAL & ACCESSORIES PARTS LIST - MAIN UNIT

200	4822 459 04892	Cabinet Front
200	4822 459 04937	Cabinet Front /21/21M
201	4822 410 11579	Button Set Open-Close
202	4822 410 11655	Button Rds CD Text/RDS
202	4822 410 11581	Button CD Text /21/21M
206	4822 410 11582	Button Set Holder CDC Select
207	4822 410 11583	Button Set CDC Select
208	4822 450 10425	Window Display CDC
210	4822 410 11584	Button Standby-On
211	4822 410 11585	Button Digital Sound
212	4822 410 11586	Button Set DBB/IS
215	4822 410 11587	Button Dolby Prologic
220	4822 410 11588	Button Set Holder Source
221	4822 410 11589	Button Set Source Select
228	4822 410 11591	Button Set Controls
229	4822 410 11592	Button Set Cs/Dub/Dolby/Rm
231	4822 450 10448	Window Disp. FW880P/22/34
231	4822 450 10445	Window Disp. FW880W/22/34
231	4822 450 10476	Window Disp. FW880P/21/21M
231	4822 450 10526	Window Disp.FW880W/21/21M
231	4822 450 10532	Window Disp. FW880/02
232	4822 450 10428	Window DSC Indication DPL
233	4822 442 01197	Panel Cover Controls
234	4822 442 01198	Panel Cover DBB/IS
237	4822 462 40683	Plate (Foot)
238	4822 529 10322	Damper Assembly
245	4822 443 10487	Door Cassette Left
246	4822 443 10488	Door Cassette Right
247	4822 492 42787	Spring Cassette
248	4822 402 10621	Push-Catch
251	4822 492 11344	Spring Compression
253	4822 492 11345	Spring Tension
255	4822 410 11594	Knob Volume Rotary
256	4822 442 01199	Cover Tray Cdc
257	4822 442 01201	Cover Door Cassette Left
258	4822 442 01202	Cover Door Cassette Right
259	4822 450 10426	Lens Cassette Left
260	4822 450 10427	Lens Cassette Right
261	4822 459 10887	Badge (Philips) Assembly
267	4822 410 11596	Knob Vocal Fader /21/21M
268	4822 410 11595	Knob Karaoke /21/21M
297	4822 462 40683	Plate (Foot)
298	4822 426 10584	Cabinet Rear
299	4822 450 10429	Window CDC
1603	4822 323 10421	Flex Cable 12P 10cm
1604	4822 323 10422	Flex Cable 4P 40cm
5001	4822 146 10929 ⚠	Mains Transformer
5001	4822 146 10952 ⚠	Mains Transformer /21/21M
349	4822 445 10774	Center Spk. Box ..P/21/21M/34
349	4822 445 10718	Center Spk. Box ..P/22
349	4822 445 10775	Surr. Spk. Box ..P/21/21M/34
349	4822 445 10719	Surr. Spk. Box ..P/22
350	4822 445 10716	Left Spk. Box ..P/21/21M/34
350	4822 445 10712	Left Spk. Box /22
350	4822 445 10776	Left Spk. Box ..W/21/21M/34
350	4822 445 10717	Right Spk. Box ..P/21/21M/34
350	4822 445 10713	Right Spk. Box /22
350	4822 445 10777	Right Spk. Box ..W/21/21M/34
351	4822 303 50063	FM Aerial
356	4822 219 10424	Remote Control RC2501/01
384	4822 303 50082	AM Frame Aerial
385	4822 321 10249 ⚠	Mains Cord
387	4822 736 15914	Instruction For Use /02/22
387	4822 736 15979	Instruction For Use /21/21M
387	4822 736 16137	Instruction For Use /34

Note: Only the parts mentioned in this list are normal service spare parts.

SCREW LISTS - MAIN UNIT

209	D2 x 8
241	D3 x 10
244	D3 x 30
252	D3 x 12
262	D3 x 10
263	D3 x 10
266	D3 x 12
269	D3 x 12
274	D3 x 12
275	D3 x 12
276	D3 x 12
277	D3 x 30
281	D3 x 12
283	M3 x 6
285	D3 x 16
287	M3 x 10
290	M3 x 6
294	M3 x 10
296	M3 x 10
302	D3 x 12
303	D3 x 12
304	M3 x 6
306	M3 x 10
307	D3 x 12
309	D3 x 10
310	D3 x 12
311	D3 x 10
312	D3 x 10
313	D3 x 10
314	M3 x 10
315	M3 x 10
323	D3 x 10
324	D3 x 12

FW880, FW880P & FW880W

A98 - 161

Service

Product Service Group CE Audio

Service Information

Already published Service Informations:

CORRECTIONS TO SERVICE MANUAL

* Page 3-3 : In the Temperature test, the display will shows the mains transformer temperature in °C. Table 2 need not be used.

DOLBY PROLOGIC BOARD

* Missing in parts list:

2640	220pF 5% 50V	4822 122 33575

ADDITIONS TO SERVICE MANUAL

Selected spare parts are now available for the Left & Right Loudspeaker Boxes. They are:

4822 240 10299	6,5" Woofer /22 & ...W/34
4822 240 10312	6,5" Woofer /21/21M & ...P/34
4822 240 10301	2,5" Tweeter /22/34
4822 240 10341	2,5" Tweeter /21/21M
4822 464 10428	Cloth Frame /22 & ...W/34
4822 464 10437	Cloth Frame Right /21/21M & ...P/34
4822 464 10438	Cloth Frame Left /21/21M & ...P/34

CHANGES DURING PRODUCTION

MAIN UNIT

* From production week 9827 the following changes are made for cost saving:
- Removal of spray printing on Button set (pos 229)
- Replacement of silk-screen print with mould-in printing for the Lens cassette (pos 259 & 260).

229	4822 410 11592	Button Set CS/Dub/Dolby/RM
259	4822 450 10426	Lens Cassette Left
260	4822 450 10427	Lens Cassette Right

* From production week 9832 the undermentioned Loudspeakers are changed to improved the tweeter design.

350	4822 445 10796	LS Box Left ...P/21/21M
350	4822 445 10797	LS Box Right ...P/21/21M
350	4822 445 10798	LS Box Left ...W/21/21M
350	4822 445 10799	LS Box Right ...W/21/21M

* From production week 9832 the following changes are made for cost saving:
- A new Cabinet Rear without CDC window opening will replaced the existing Cabinet Rear (pos 298) and Window CDC (pos 299)
- A new plastic badge, name will replaced the existing metal badge (pos 261). The new badge has larger pins of diameter 1.6mm, therefore the pin holes of old Cover, Tray CDC (pos 256) needs to be enlarged (by drilling) before applying the new badge.

The new service codes are:

261	4822 454 13408	Badge, Philips assembly
298	4822 426 10601	Cabinet Rear w/o CDC window

FRONT BOARD

* During production the undermentioned was implemented:

7461	4822 900 11253	TMP87PS71F SW ver.25 (OTP)

(Reason: To solve /34 FM Auto-search problem, it has no consequence on other application)

* From production week 9834 the undermentioned components are changed to solve tape deck auto-release during play when activating Dolby button from ON to OFF.

Change	3668 to 270R 1% 0,1W	4822 117 11504
	3679 to 8k2 5% 0,1W	4822 051 20822

1998 - 09 - 02

4822 725 25841

AF5 BOARD

- From production week 9820 onwards layout stage .2 (identified by the last digit of the 12-digit code printed on the copper pattern) is implemented.
  Reason: Re-layout to improve EMC performance.

  Delete 4521 and 4644

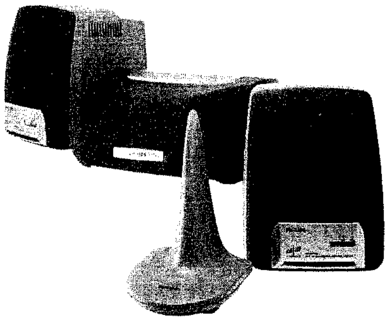
- From production week 9833 onwards layout stage .3 (identified by the last digit of the 12-digit code printed on the copper pattern) is implemented.
  Reason:
  - To change the tape deck motor supply to +12M instead of +12.
  - Re-orientation of Dipmate 31 to improve production process.

Wireless Surround Set

PHIL -05243

FB207W/01/10/14

Service
Service
Service



Service Manual

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GB   4822 725 25803

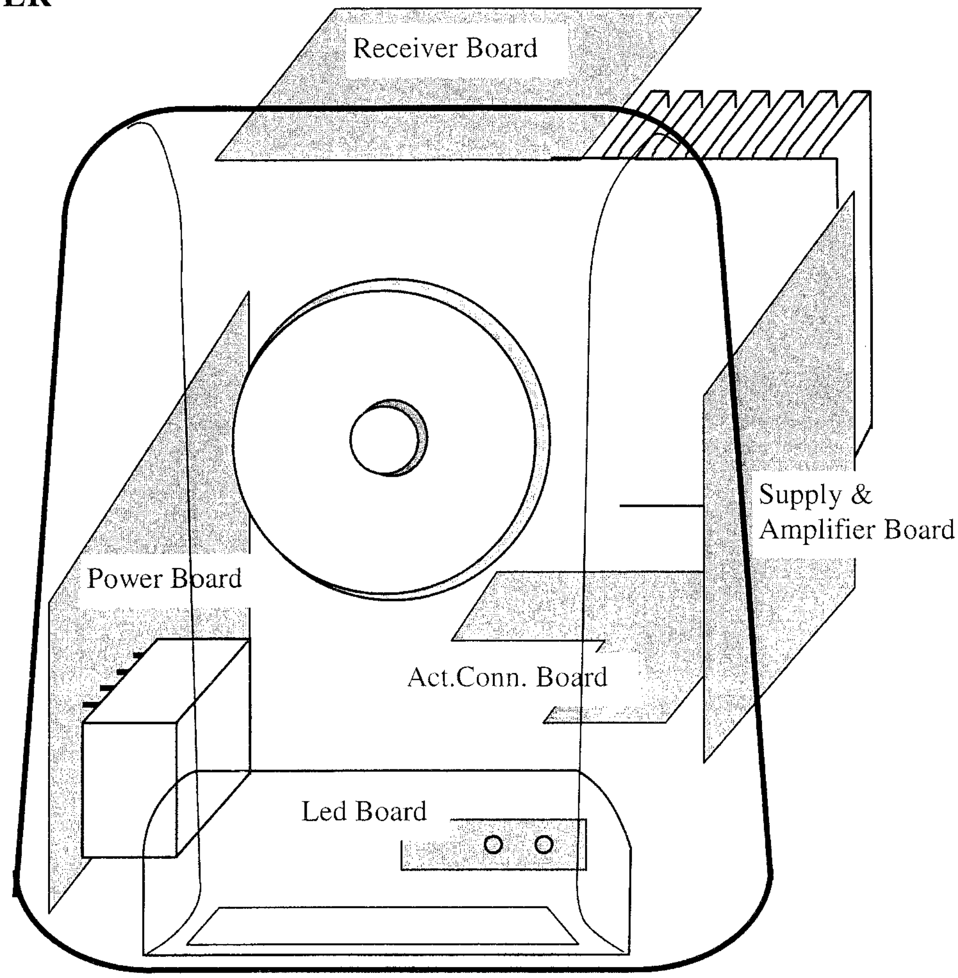
PCS 100 124

PHILIPS

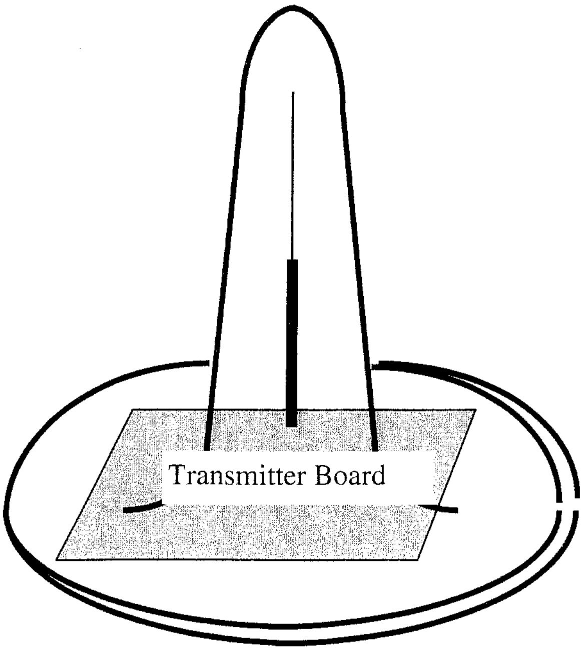
5243

LOCATION OF PRINTED CIRCUIT BOARDS

RECEIVER


Receiver Board
Supply &
Amplifier Board
Power Board
Act.Conn. Board
Led Board

TRANSMITTER


Transmitter Board

TECHNICAL SPECIFICATION

General
Mains voltage : 230V 50Hz for /10/14 versions
120V/230V 50/60Hz switchable for /01 version
System : Radio Frequency (RF)
Carrier Frequency : 433MHz for /01/14 version
926MHz for /10 version
Frequency selection : 7 positions from 433.375MHz to 434.500MHz (frequency grid = 0.1875MHz)
7 positions from 925.500MHz to 927.000MHz (frequency grid = 0.250MHz)
Modulation : Frequency modulation (FM)

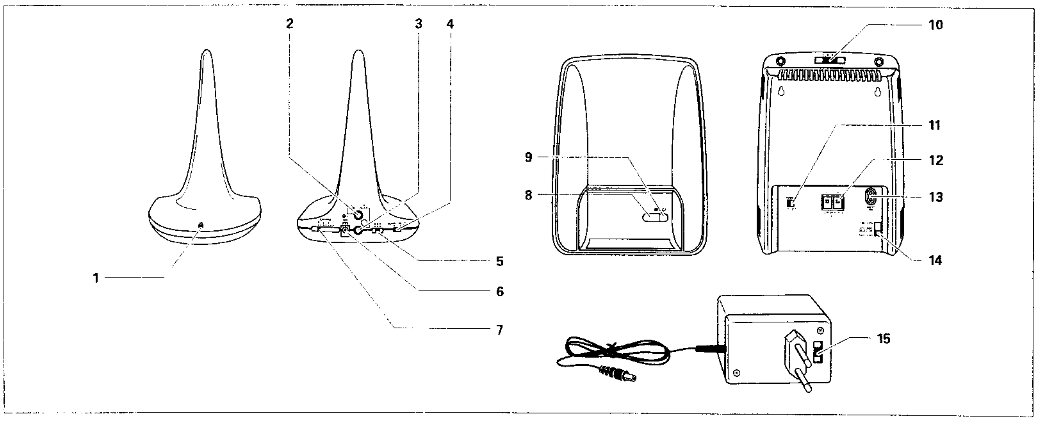
Transmitter Unit
Supply : AC/DC adaptor with internal overload protection.
DC = 14V I = 150mA
Input Sensitivity & impedance : 3 positions: A - B - C
A = 0.5V for 75kHz deviation, input impedance 21 kohm
B = 5V for 75kHz deviation, input impedance 200 kohm
C = 15V for 75kHz deviation, input impedance 700 kohm
Transmitter power : < 10mW
Working range : < 10m
LED : 3 functions
ON = normal operation
OFF = Standby
Blinking = input signal too high
Mode switch : 2 position
Companded signal (surround)
Non-companded signal (multi) not used
Standby : after 90 seconds (no input signal available)

Actvie Surround Box
Power consumption Standby : 8.2W
Output power : 2 x 17W D = 10%
Music power : 2 x 40W
Frequency response : 100Hz.....15kHz ± 3 dB
Impedance at speaker terminal : 3 ohm
Distortion 1kHz 1W : < 3%
Max DC offset on speaker terminal : ± 100mV
LED green : Power on
Red : Standby
Dimensions (w x h x d) : 174 x 220.5 x 163mm

Passive Surround Box
Type : Full range speaker
Music power : 40W
Impedance : 3 ohm
Frequency response : 100Hz.....15kHz ± 3 dB
Dimensions (w x h x d) : 174 x 220.5 x 163mm

Center Box
Type : 2 way 3 speaker Bass reflex
Music power : 120W
Impedance : 6 ohm
Frequency response : 75Hz.....20kHz
Dimensions (w x h x d) : 400 x 145 x 145mm

CONTROLS



Transmitter unit

1	Status light	**RED:** Transmitter is on. **BLINKING:** Transmitter is on and input level is too high (see 5). **OFF:** Transmitter is in standby mode or not connected to the AC/DC adapter.
2	**L (SUB)**	Not used with the delivered configuration.
3	**R (SURR)**	To connect the transmitter unit to the SURROUND OUT (SURR PRE OUT) of your set.
4	**SURR / MULTI**	Set this selector to SURR, the position MULTI is not used with the delivered configuration.
5	**A·B·C**	To set the input sensitivity of the transmitter unit. **A**: maximum sensitivity **B**: medium sensitivity **C**: minimum sensitivity
6	**14 V**	To connect the transmitter unit to the AC/DC adapter provided.
7	**CHANNEL**	7 step channel selector for setting the transmitting channel in case of interferences.

Note: *– Always be sure that the transmitter unit and the active surround speaker are switched to the same transmitting channel, otherwise no sound or only a distorted sound will be heard on the surround speakers.*

– Cellular phones used near the system (1–2 metres) may interfere with the transmission.

– You have to switch off the active surround speaker before setting the transmitting channel.

Active surround speaker

8	⏽	**GREEN LIGHT:** If this is on, the active speaker is on.
9	⏻	**RED LIGHT:** If this is on, the active speaker is in standby mode.

Note: *– If both lights are off the active speaker is switched off or not connected to the mains.*

10	**CHANNEL**	7 step channel selector for setting the transmitting channel in case of interferences.
11	**POWER**	To switch the active surround speaker on and off.
12	**TO PASSIVE BOX**	To connect the active surround speaker to the passive surround speaker.

Important!

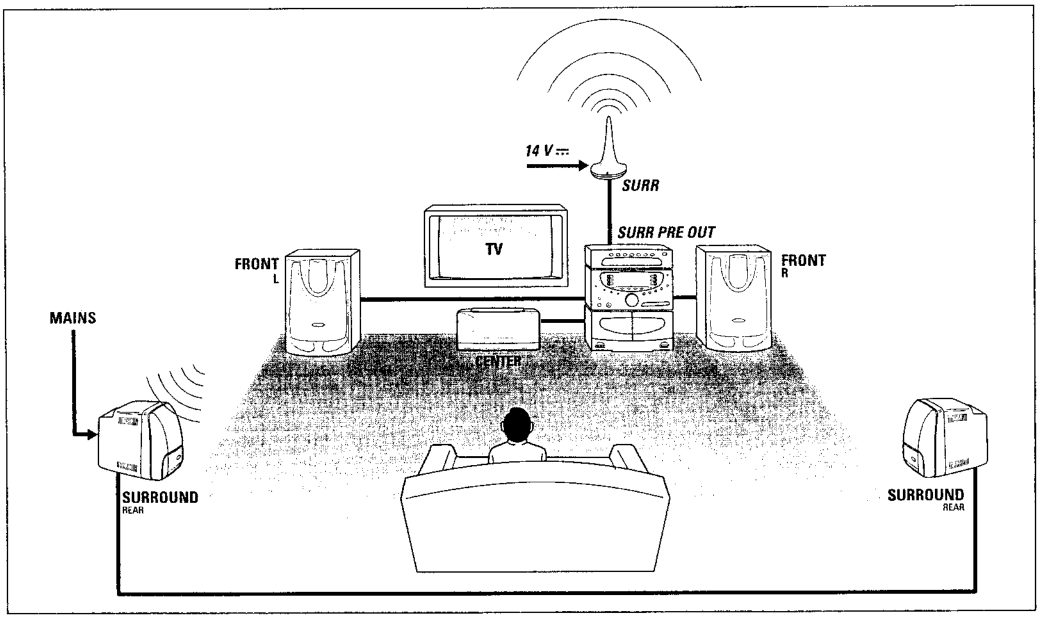
Do not connect any amplifier or set to the "TO PASSIVE BOX" output!

13	**MAINS**	To connect the active surround speaker to the mains.
14	**VOLTAGE SELECTOR**	(*Not on all versions*) Set this selector to your local mains voltage. If the selector must be reset, disconnect the mains lead first.

AC/DC adapter

15	**VOLTAGE SELECTOR**	(*Not on all versions*) Set this selector to your local mains voltage. If the selector must be reset, disconnect the mains lead first.

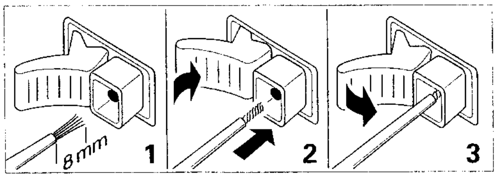
CONNECTIONS

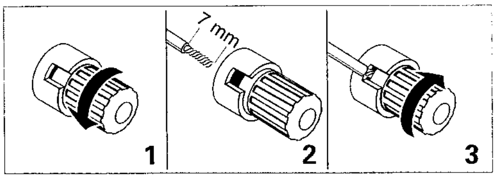


Important!
Always switch off all your equipment before making any connections!

For connecting your wireless speaker system refer to the picture above.

The loudspeaker connections on the appliance may be screw connectors or click-fit connectors.





At the rear of the appliance you will find a coloured or ⊕ terminal and a black or ⊖ terminal for each speaker.

Note: – After connecting all the speakers, do not forget to adjust the relative sound level between them.

Front speakers (not included) and centre speaker
Connect the coloured speaker wire to the coloured or ⊕ terminal, and the black wire to the black or ⊖ terminal of the appliance.

Surround speakers
Your wireless speaker system includes two different surround speakers. One is the active surround speaker; the other one is the passive surround speaker. You can identify the active speaker by the controls on the rear.

Connect the active to the passive speaker with the speaker cable provided. Connect the coloured wire to the coloured terminal, and the black wire to the black terminal on both speakers. Connect the active speaker to the mains with the mains cable provided. Switch on the active speaker with the POWER switch.

Transmitter unit
Connect the SURR terminal of the transmitter unit with the PRE OUT (SURROUND) terminal of the appliance using the supplied cinch cable. Connect the AC/DC adapter supplied to the 14 V socket of the transmitter unit. Then connect the AC/DC adapter to the mains.

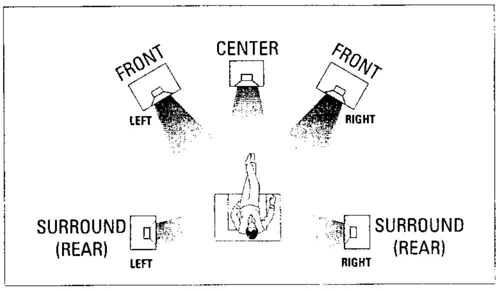
Note: – The SUB terminal of the transmitter unit is not used with this set.

Positioning of the transmitter unit

Position the unit in a way that you are able to "see" the active surround speaker from the position of the unit.

To avoid sound distortions caused by magnetic fields do not place the transmitter unit on your TV set.

Positioning of the speakers



Important!

To avoid overheating do not cover any vents and leave a minimum distance of 5 centimeters (2 inches) for ventilation.

General hints for positioning
Avoid positioning the speakers in a corner or on the floor, as this will boost the bass tones too much. Placing the speakers behind curtains, furniture etc. will reduce the treble response, thus reducing the stereo effect considerably. The listener should always be able to "see" the speakers.

Each room has different acoustic characteristics and the positioning possibilities are often limited. You can find the best position for your speakers by following the picture above. The speakers should always be arranged as symmetrically as possible in the room.

Positioning the centre speaker
The centre speaker should be placed in the centre between both front speakers, e. g. underneath or on top of the TV. The best height for the centre speaker is at the height of the listener's ears (while seated).

Positioning the surround speakers
The surround speakers should face each other and be in line with, or at most 1.5m (4ft 6ins) behind the listener.

Adjusting the relative sound level

After installing your speakers, you will have to find a good sound balance between the surround, the centre and the front speakers.

In the instruction booklet of your appliance you will find a section describing how to adjust the sound of the different speakers. Follow those instructions to get the most out of your new PHILIPS speakers.

Setting the input sensitivity A·B·C

Depending on which sound source you use, the signals delivered have different strengths.

If the red light on the front of the transmitter unit **starts to blink**, the incoming signal is too strong. This will cause distortions! Set the A·B·C switch to adjust the input sensitivity to a lower level. If the red light on the front of the transmitter unit **goes off** during play, the incoming signal is not strong enough. Set the A·B·C switch to adjust the input sensitivity to a higher level.

Setting the transmitting channel

In case of interferences of the signal from the transmitter unit it is possible to shift to another transmitting channel.

1. Switch off the active surround speaker.

2. Set the CHANNEL slide at the back of the transmitter unit to another number.

3. Set the CHANNEL slide at the back of the active surround speaker to the same number as on the transmitter.

4. Switch on the active surround speaker.

Note: – Always be sure that the transmitter unit and the active surround speaker are switched to the same transmitting channel, otherwise no sound or only a distorted sound will be heard on the surround speakers.

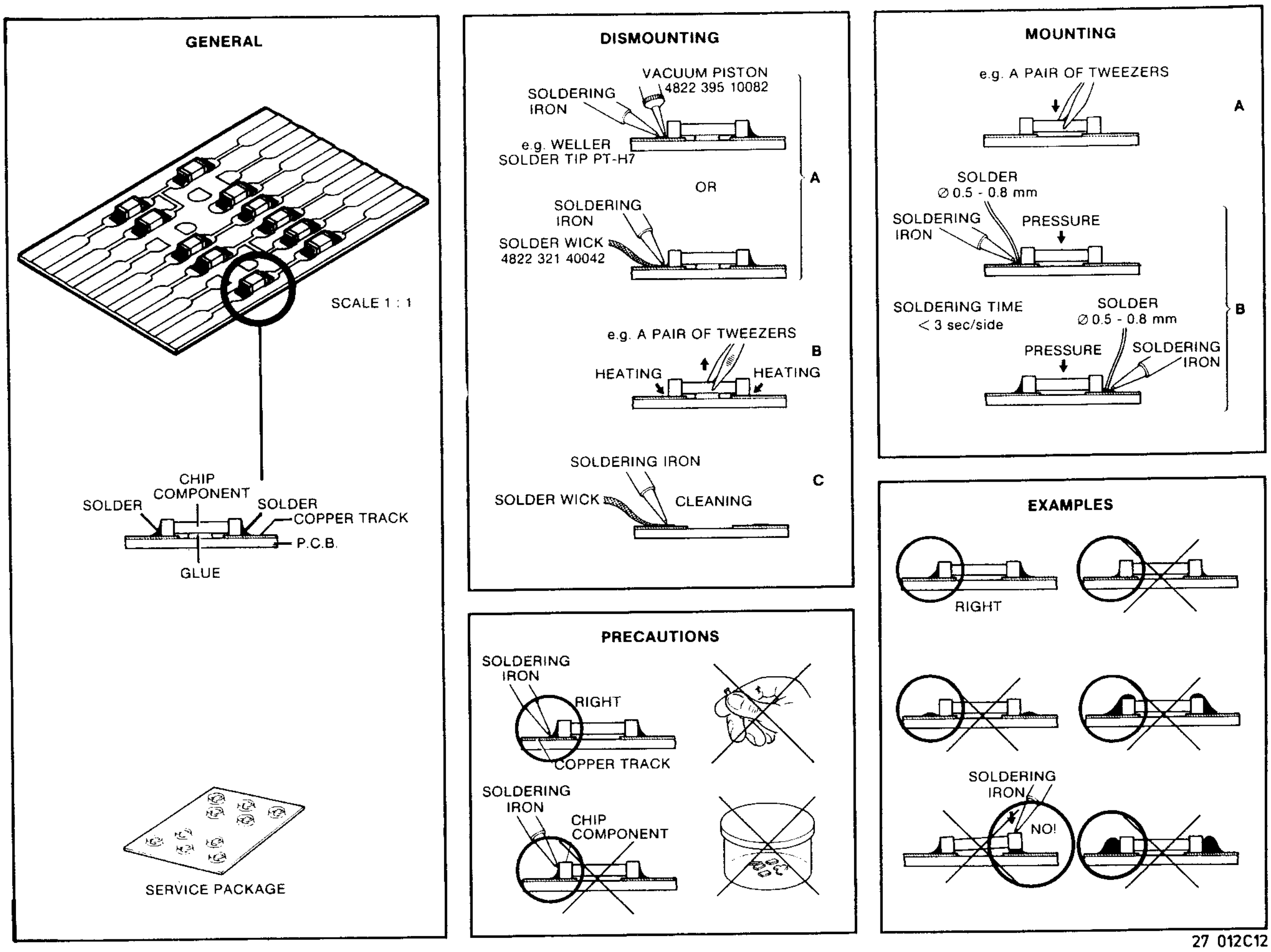
Switching On·Standby·Off

The transmitter unit is equipped with a sensitive input. If there is no signal on the SUB and SURR input the transmitter and the surround speakers will switch to standby after approximately 100 seconds.

The green light on the front of the active surround speaker shows that the speaker is on. If the red light is on, the speaker has switched to standby. To switch the active speaker off, use the POWER switch.

If the red light on the front of the transmitter is off, it has switched to standby. To switch the transmitter off, unplug the AC/DC adapter from the mains.

HANDLING CHIP COMPONENTS


GENERAL
SCALE 1 : 1
CHIP COMPONENT
SOLDER
SOLDER
COPPER TRACK
P.C.B.
GLUE
SERVICE PACKAGE
DISMOUNTING
VACUUM PISTON 4822 395 10082
SOLDERING IRON
e.g. WELLER SOLDER TIP PT-H7
OR
SOLDERING IRON
SOLDER WICK 4822 321 40042
A
e.g. A PAIR OF TWEEZERS
HEATING
HEATING
B
SOLDERING IRON
SOLDER WICK
CLEANING
C
MOUNTING
e.g. A PAIR OF TWEEZERS
A
SOLDER ∅ 0.5 - 0.8 mm
SOLDERING IRON
PRESSURE
SOLDERING TIME < 3 sec/side
SOLDER ∅ 0.5 - 0.8 mm
PRESSURE
SOLDERING IRON
B
PRECAUTIONS
SOLDERING IRON
RIGHT
COPPER TRACK
SOLDERING IRON
CHIP COMPONENT
EXAMPLES
RIGHT
SOLDERING IRON
NO!

27 012C12

WARNING

ESD

(GB) WARNING

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD).
Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance.
Keep components and tools also at this potential.

(NL) WAARSCHUWING

Alle IC's en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen.
Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

(F) ATTENTION

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).
Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.
Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

(D) WARNUNG

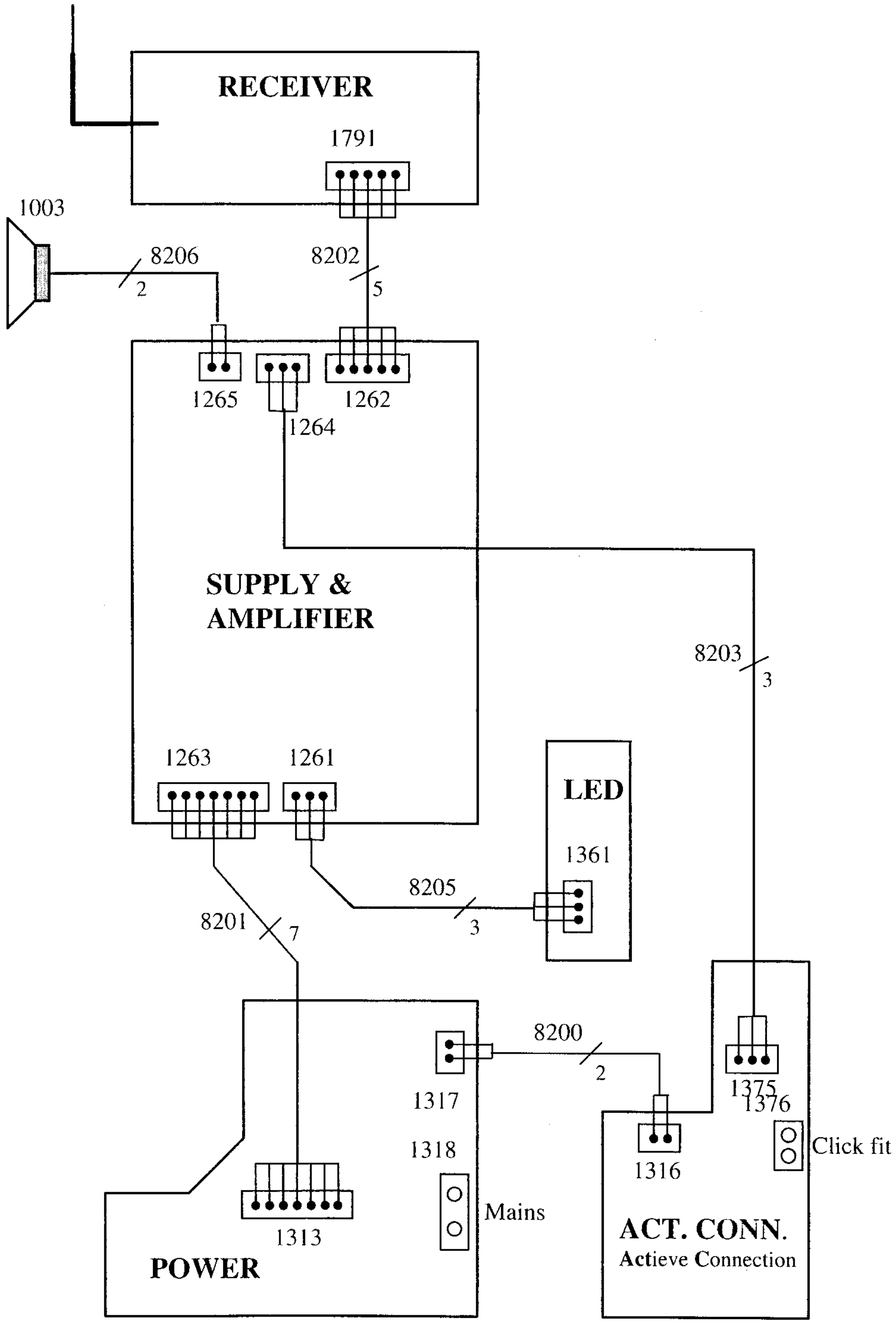
Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfähltige Behandlung im Reparaturfall kan die Lebensdauer drastisch reduzieren.
Veranlassen Sie, dass Sie im Reparaturfall über ein Pulsarmband mit Widerstand verbunden sind mit dem gleichen Potential wie die Masse des Gerätes.
Bauteile und Hilfsmittel auch auf dieses gleiche Potential halten.

(I) AVVERTIMENTO

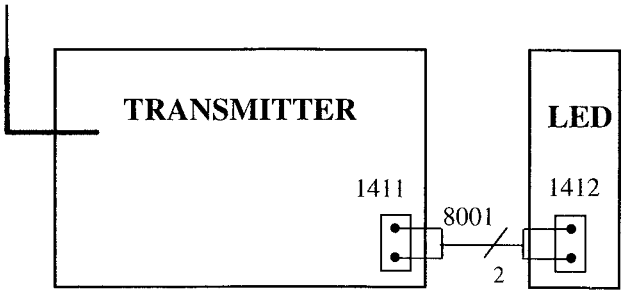
Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione.
Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

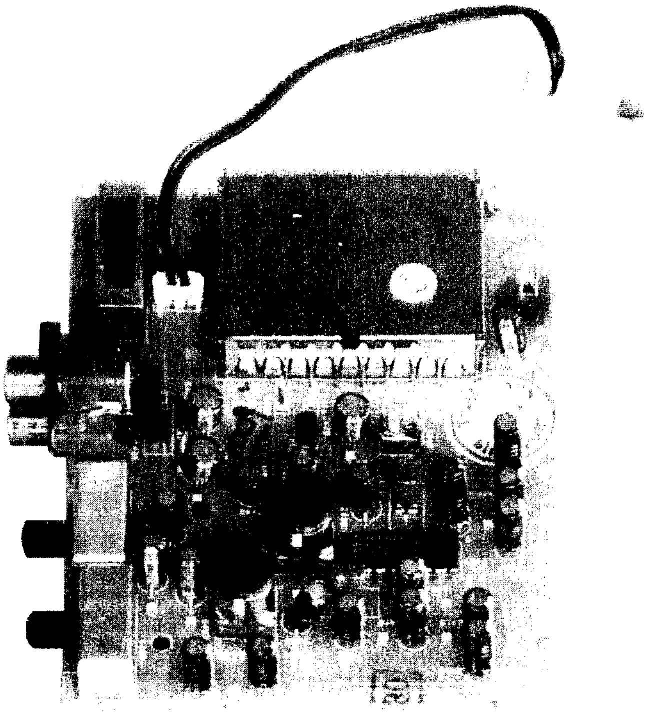
WIRING DIAGRAM

RECEIVER


RECEIVER
1791
1003
8206
2
8202
5
1265
1264
1262
SUPPLY &
AMPLIFIER
8203
3
1263
1261
LED
1361
8205
3
8201
7
8200
2
1317
1318
Mains
1375
1376
Click fit
1316
1313
POWER
ACT. CONN.
Actieve Connection

TRANSMITTER


TRANSMITTER
LED
1411
1412
8001
2



TRANSMITTER

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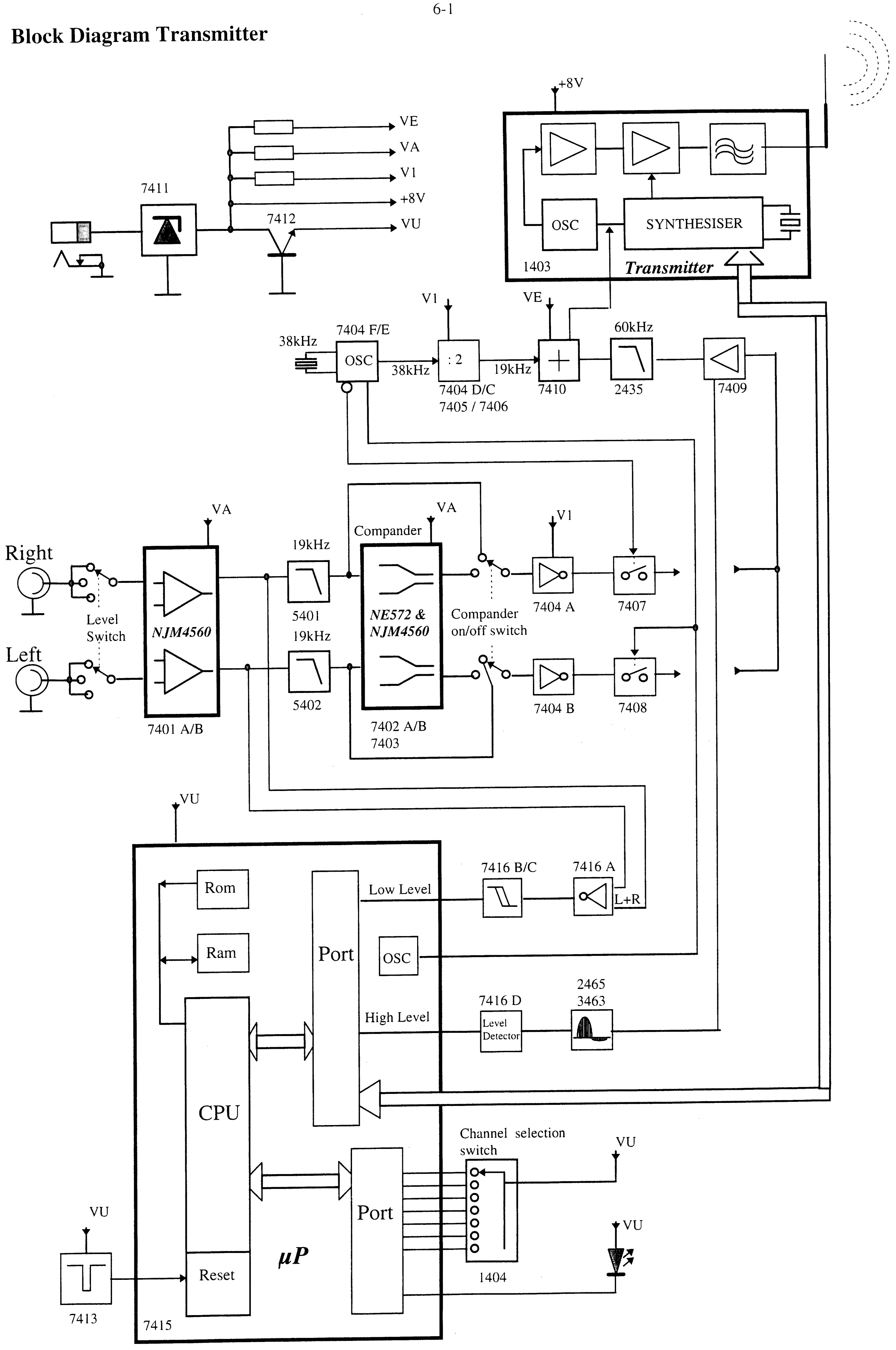
Component layout 6-4
Partslist 6-5

Block Diagram Transmitter



TRANSMITTER CIRCUIT DESCRIPTION

1. General overview of the total block diagram:

We can recognise 4 basic blocks in the diagram :
1-The modulator assy: (1403)
This is a screened module,containing an own FR4 material . It contains an oscillator , a PLL system based upon a 4MHz ref quartz.There is the possibility to apply a modulation signal to a varicap diode Further there is a buffer , final amplifier and output filter to deliver the RF power to the antenna . Power can be switched on , off, and low power.
2-Stereocoder:
There is a stereocoder on board that gives the possibility to make a standard FCC type system with 19 kHz / 38 kHz subcarriers .It is build around Ic 7404 / 7410 and a tuning fork of 38 kHz .
3-Audio path:
The audio processing part contains an input sensitivity switch (3pos) , an input buffer 7401 , a low pass filter 5401/5402 to prevent signals above 15 kHz from reaching the compander / modulator . There is a companding circuit to compand the input dynamic range with a factor of 2 (in dB). It consists of Ic NE572 and opamp NJM4560 . It is possible to switch signals to normal or companded mode .
4-The microcontroller: (7415).
The microcontroller part uses the 38 kHz clock signal from the stereocoder .It has 4 basic functions to do : -read the 7 pos. channnel selection switch -check the max modulating level via ic 7416 -check for no modulation via ic 7416 -drive a LED to visualise normal and fault condition

2. Detailed description of the modulator part:

The modulator is housed in a screened box , containing a FR4 pb material . A lot of attention has been paid for achieving good rejection of the harmonics , since strict requirements from ETSI and FCC must be met . The local oscillator is made around transistor 7108 , in common-base configuration . The frequency determining component is a dielectric resonator , loosely coupled to the collector . The feedback around the transistor is achieved via cap 2126 / 2130 . In parallel with the resonator there is a temp compensating capacitor 2125 and a varicap diode 6134 . The varicap is driven by the PLL loop filter for the very low frequencies . For the higher frequencies (>30 Hz) the drive comes via the modulator input to allow the AF spectrum to modulate the LO in FM .
The dielectric resonator has the advantage of offering a good Q and high stability . Since it is a shorted $\lambda/4$ line on a ceramic material one can best compare it with a parallel resonant circuit . The PLL system is made with Ic 7401 (TSA5520) , which is widely used in the video world . The synthesiser can be driven by I^2C or serial bus . We have choosen the I^2C bus for compatibility reasons with TV . When build in a TV one can acces the synthesiser via the main TV system I^2C bus . The address defined for this application is C6 (hex) . The ref. quartz used here is a 4 MHz type . It is divided internally to a reference frequency of 62.5 kHz . The Ic also has a loop amplifier . With only few components added for the loop filter one can have stable operation . The loop filter main design criteria was to achieve a low -3dB freq and low boosting effect for the lower modulating frequencies (<100 Hz) . The proper division ratio for the internal divider can be loaded in the shift register .The ic has some switches that can accessed via I^2C. They are used for :

- switching off the power supply of the osc transistor (BS2)
- switching to low power (BS3)
- switching off the supply of the buffer and final amplifier (BS4).

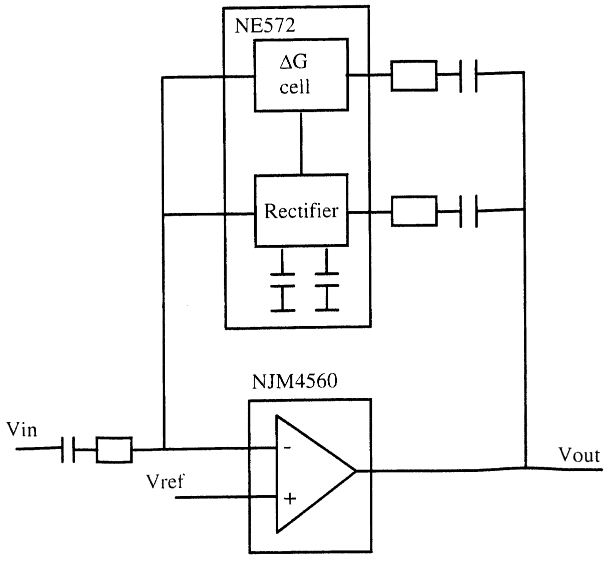
The oscillator signal is buffered in transistor 7109 as to give proper isolation towards the oscillator part when activating the diode switch . This diode switch (6135) actually attenuates the signal from the buffer . It is activated via switch BS3 and is actually used for operation at a bit lower power , currently still needed by law in Switserland . The final amplifier is a standard CE configured transistor 7107 . There is a 5th order low pass Chebychev filter at the output. The output impedance is designed for 50 ohms.

3. Detailed description of the stereo coder part:

The stereo coder clock oscillator is an oscillator build around a 38kHz tuning fork and 2 inverter gates 7404E/F . It delivers a square wave with normal and inverted output . The inverter gates are put in linear mode by the resistors 3443/3444 . These signals are used to drive the stereo matrix or DSB (double-side band) generator formed by transistors 7407 / 7408 . When the base of one transistor is “low” then the device is conducting . On the other hand during the same time the other transistor is “off” , since the base is “high”. Inverter gates 7404A/B are serving as buffers . They are also put in analog mode . The DSB signal is fed to 7409/7410. The purpose of this stage is to make some buffer and low-pass filter to reject the harmonics of the 38 kHz signals . It has a cutoff frequency of about 60 kHz . One other purpose is to inject the 19 kHz pilot injection to the DSB spectrum at a level of approx 9 % of the max AF signal . Before injection into the modulator input there is the provision to align the max modulation (dev 75 kHz) with potmeter 3442 . The inverter gates 7404C/D are serving as a divide by 2 for the 38 kHz signal .

4. Detailed description of the audio processing & companding circuits

The basic compander configuration is given below . From the diagram one can understand the factor of 2 of companding as follows :
There is a variable gain cell (variable res) in the feedback loop of an opamp (NJM) . If the input Vin rises with eg 4 times then the output can rise only 2 times . This is because the feedback res formed by the gain cell is decreased with a factor of 2 . Remember for an opamp Vout = Vin x (Rf/Rin) where Rin is constant.



TRANSMITTER CIRCUIT DESCRIPTION

The left and right signal inputs are coming in via cinch socket 1401 . To adjust for different kinds of sources an input sensitivity switch pos 1406 (3 pos) is foreseen. Now the sens. pos. are configured for 15 / 5 / 0.5 Vrms. The signals are then buffered with opamp 7401 (NJM4560) . The buffering allows precise termination towards the MPX input filter . The main goal is to prevent signals above 15 kHz (the normal AF range) from entering the companding system . Those signals would obstruct correct companding throughout the dynamic range of the signal . It is possible to bypass the compander via switch 1405 . For later second room applications or compatibility with wireless headphones etc, the system can be put in non-companding mode . Note that the opamp outputs (L&R) are combined to drive the comparator for “excessive” modulation . The uP will interprete when the schmitt trigger is activated by a too high signal and let the LED go to “blinking” mode .

5. Description of the microcontroller operation and ass. circuitry

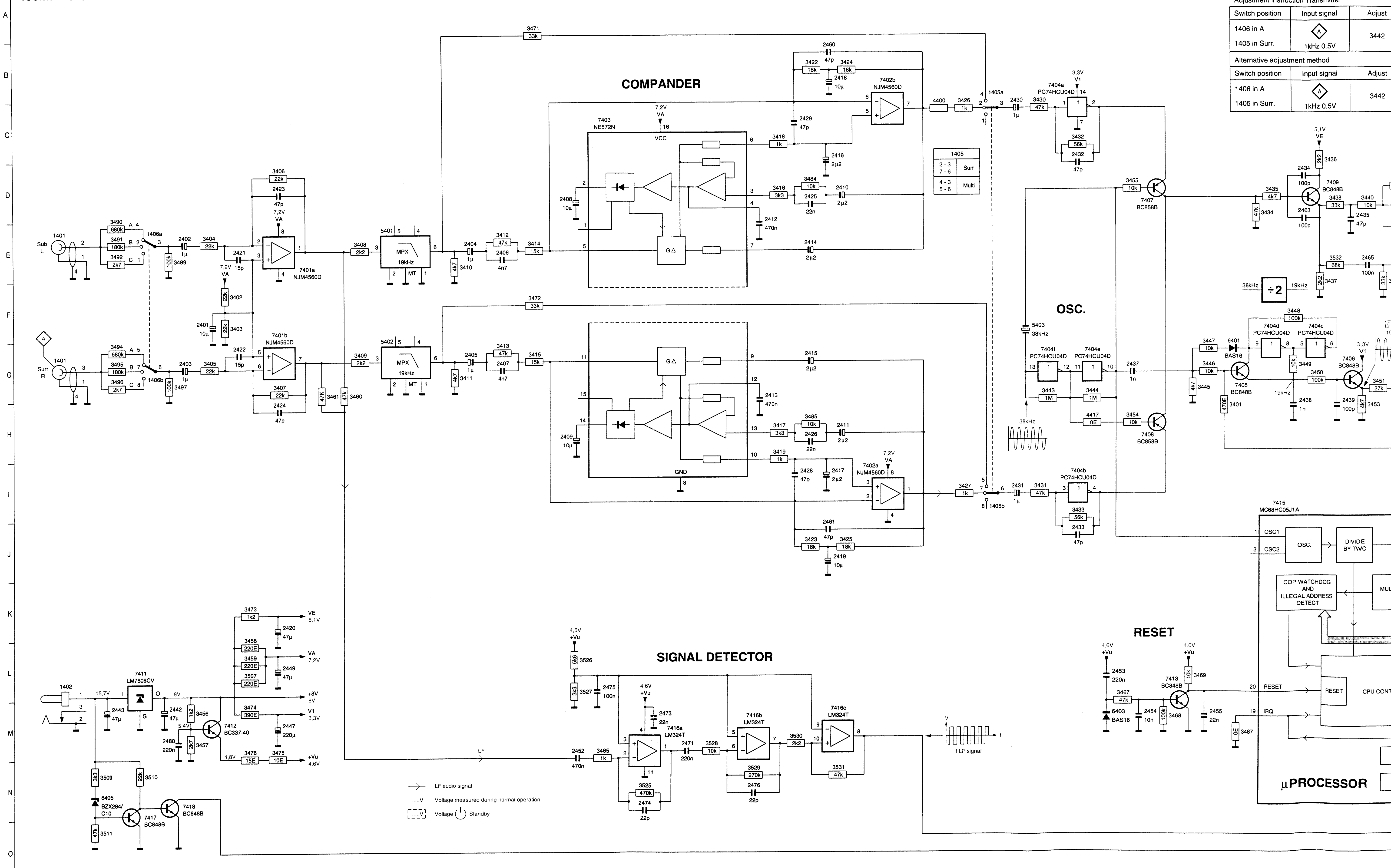
The microcontroller is a Motorola MC68HC05 with 1.2 kbit ROM and 14 I/O lines . It is capable of doing both the transmitter and receiver function by proper setting of an input flag . The primary job functions of this uP in transmitter mode are :

-read the 7 pos channel switch
-drive the modulators synthesiser ic via the I^2C line
-check the level for overmodulation as signalled by 7416D
-check the no-signal level , signalled by 7416A/B/C
-drive a LED to indicate three states:
  -normal operation (on)
  -overmodulation (blinking)
  -standby (off)

The clock oscillator is extracted from the stereo coders 38kHz clock . There is a reset circuit that makes sure of proper program starting at power-on . The no-signal detection circuit is getting the summation of the L&R signal . This is amplified in 7416A and 7416B to a higher level . This is followed by a schmitt-triggers , to trigger the uP input port PB2 at pin 6 . The overmodulation detection circuit consists of 7416D / 7420 . It is the intention to have at 30-50% overmodulation a triggering of uP port PB3 , pin 5 of 7415 . To go to standby mode it is to be noted that there is a software delay of approx 90 sec. before entering standby mode and switching off the LED . In contrast , overmodulation is interpreted quicker to allow the user to set the input sensitivity switch to the proper level.

Notes:

433MHz & 914MHz & 926MHz TRANSMITTER


COMPANDER
OSC.
RESET
SIGNAL DETECTOR
µPROCESSOR
Sub L
Surr R
1401
1402
1406a
1406b
1405a
1405b
7401a NJM4560D
7401b NJM4560D
7402a NJM4560D
7402b NJM4560D
7403 NE572N
VCC
GND
GΔ
5401
5402
MPX 19kHz
MT
7404a PC74HCU04D
7404b PC74HCU04D
7404c PC74HCU04D
7404d PC74HCU04D
7404e PC74HCU04D
7404f PC74HCU04D
7405 BC848B
7406 BC848B
7407 BC858B
7408 BC858B
7409 BC848B
7411 LM7808CV
7412 BC337-40
7413 BC848B
7415 MC68HC05J1A
7416a LM324T
7416b LM324T
7416c LM324T
7417 BC848B
7418 BC848B
6401 BAS16
6403 BAS16
6405 BZX284/C10
5403 38kHz
38kHz
19kHz
÷2
OSC1
OSC2
OSC.
DIVIDE BY TWO
COP WATCHDOG AND ILLEGAL ADDRESS DETECT
RESET
IRQ
CPU CONT
1405
2 - 3 7 - 6 Surr
4 - 3 5 - 6 Multi
VE 5,1V
VA 7,2V
+8V 8V
V1 3,3V
+Vu 4,6V
15,7V
LF
if LF signal
LF audio signal
....V Voltage measured during normal operation
Voltage Standby

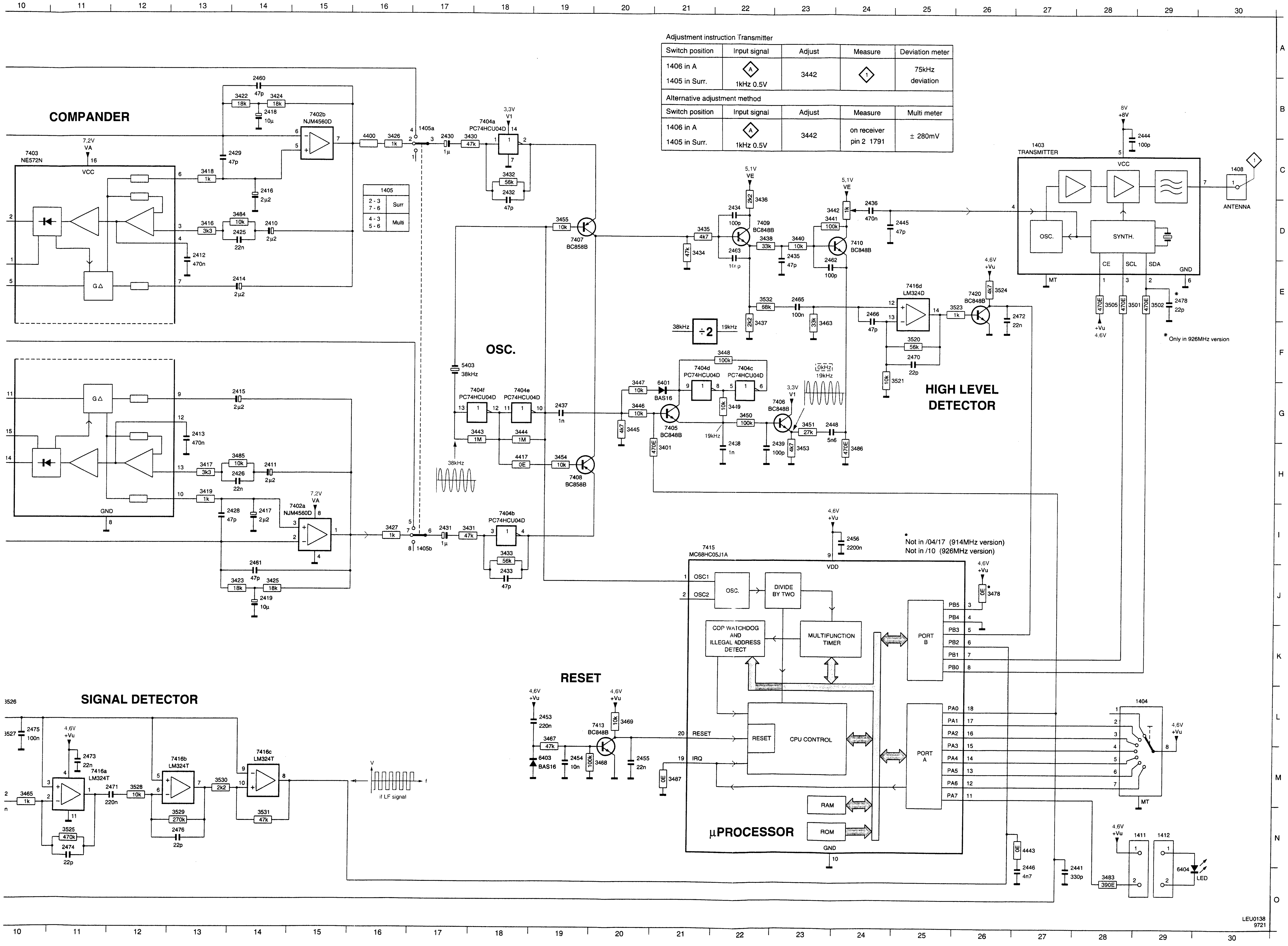
Adjustment instruction Transmitter

Switch position	Input signal	Adjust
1406 in A 1405 in Surr.	A 1kHz 0.5V	3442

Alternative adjustment method

Switch position	Input signal	Adjust
1406 in A 1405 in Surr.	A 1kHz 0.5V	3442

TRANSMITTER
3104 217 04650/04680/05370 bl. 130 - 01

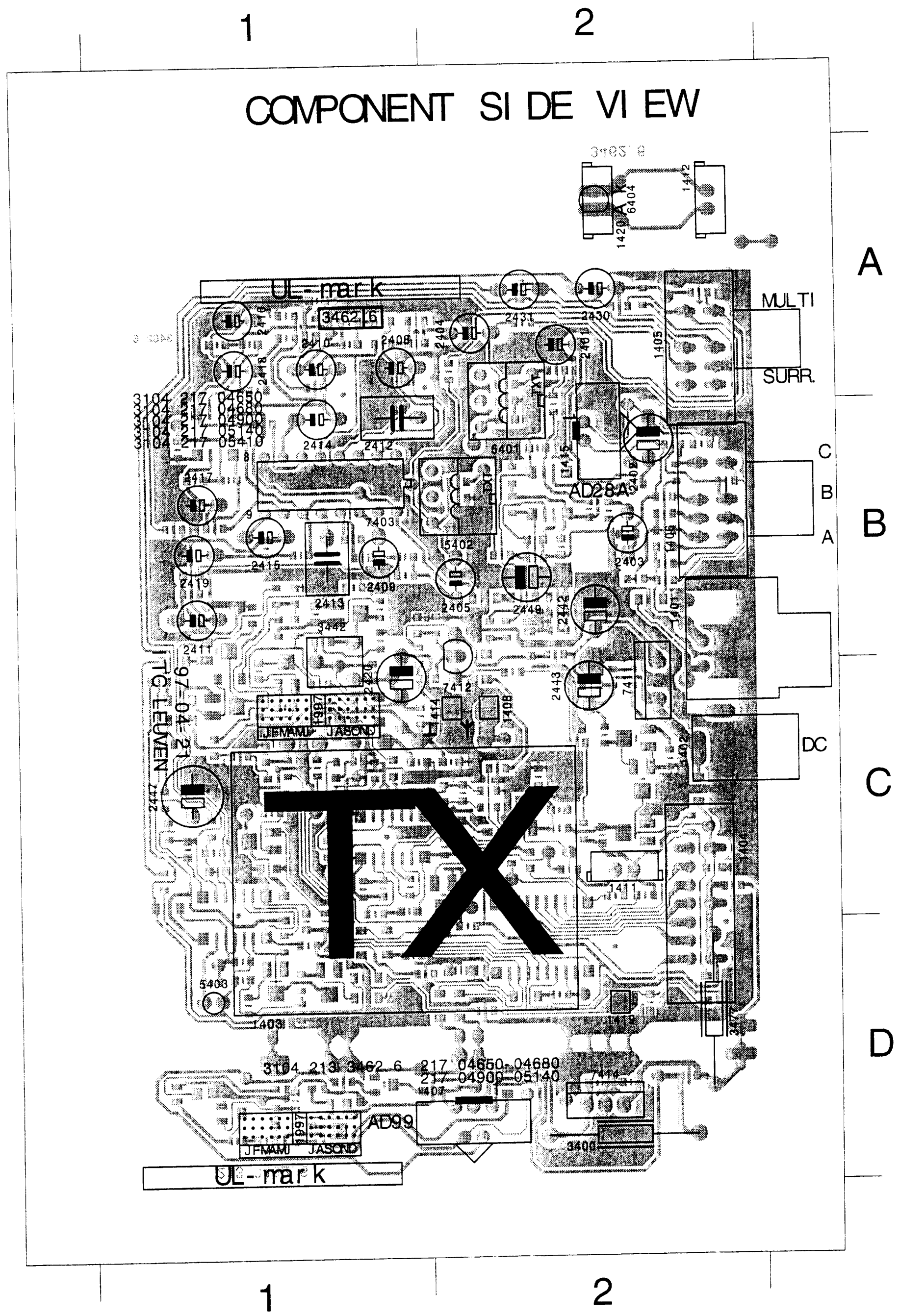

COMPANDER
7403
NE572N
7.2V
VA
VCC
GND
GΔ
7402b
NJM4560D
7402a
NJM4560D
1405
2-3 7-6 Surr
4-3 5-6 Multi
1405a
1405b
OSC.
5403
38kHz
7404a
PC74HCU04D
7404b
PC74HCU04D
7404f
PC74HCU04D
7404e
PC74HCU04D
7404d
PC74HCU04D
7404c
PC74HCU04D
38kHz
19kHz
÷2
7407
BC858B
7408
BC858B
7409
BC848B
7410
BC848B
7405
BC848B
7406
BC848B
6401
BAS16
3,3V
V1
5,1V
VE
HIGH LEVEL DETECTOR
7416d
LM324D
7420
BC848B
4,6V
+Vu
1403
TRANSMITTER
VCC
OSC.
SYNTH.
CE
SCL
SDA
GND
MT
8V
+8V
1408
ANTENNA
* Only in 926MHz version
RESET
7413
BC848B
6403
BAS16
7415
MC68HC05J1A
VDD
OSC1
OSC2
OSC.
DIVIDE BY TWO
COP WATCHDOG AND ILLEGAL ADDRESS DETECT
MULTIFUNCTION TIMER
RESET
IRQ
CPU CONTROL
PORT B
PORT A
PB5
PB4
PB3
PB2
PB1
PB0
PA0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
RAM
ROM
µPROCESSOR
GND
• Not in /04/17 (914MHz version)
Not in /10 (926MHz version)
1404
1411
1412
6404
LED
SIGNAL DETECTOR
7416a
LM324T
7416b
LM324T
7416c
LM324T
if LF signal
LEU0138
9721

Adjustment instruction Transmitter

Switch position	Input signal	Adjust	Measure	Deviation meter
1406 in A 1405 in Surr.	◇A 1kHz 0.5V	3442	◇1	75kHz deviation
Alternative adjustment method				
Switch position	Input signal	Adjust	Measure	Multi meter
1406 in A 1405 in Surr.	◇A 1kHz 0.5V	3442	on receiver pin 2 1791	± 280mV

1401	G1	3448	F22
1401	E1	3449	G22
1402	L1	3450	G22
1403	C27	3451	G23
1404	L29	3453	H23
1405a	B17	3454	H19
1405b	I17	3455	D19
1406a	E3	3456	M3
1406b	G3	3457	M3
1408	C30	3458	L4
1411	N29	3459	L4
1412	N29	3460	G6
2401	F3	3461	G6
2402	E3	3463	F23
2403	G3	3465	M10
2404	E8	3467	L19
2405	G8	3468	M20
2406	E8	3469	L20
2407	G8	3471	A9
2408	D9	3472	F9
2409	H9	3473	K4
2410	D14	3474	M4
2411	H14	3475	M5
2412	E13	3476	M4
2413	G13	3478	J26
2414	E14	3483	O28
2415	G14	3484	D14
2416	C14	3485	H14
2417	I14	3486	H24
2418	B14	3487	M21
2419	J14	3490	D2
2420	K5	3491	E2
2421	E4	3492	E2
2422	G4	3494	G2
2423	D5	3495	G2
2424	H5	3496	G2
2425	D14	3497	G3
2426	H14	3499	E3
2428	I13	3501	E28
2429	C13	3502	E29
2430	C17	3505	E28
2431	I17	3507	L4
2432	C18	3509	N2
2433	J18	3510	N2
2434	D22	3511	O2
2435	D23	3520	F25
2436	D24	3521	G24
2437	G19	3523	E25
2438	H22	3524	E26
2439	H22	3525	N11
2441	O27	3526	L10
2442	M3	3527	L10
2443	M2	3528	M12
2444	B29	3529	N13
2445	D25	3530	M13
2446	O27	3531	N14
2447	M5	3532	E22
2448	G23	4400	C16
2449	L5	4417	H18
2452	M10	4443	N27
2453	L19	5401	E6
2454	M19	5402	G6
2455	M20	5403	F17
2456	I24	6401	G21
2460	B14	6403	M19
2461	J14	6404	O29
2462	E23	6405	N2
2463	D22	7401a	E5
2465	E23	7401b	F5
2466	E24	7402a	I14
2470	F25	7402b	B15
2471	M11	7403	C10
2472	E26	7404a	B18
2473	M11	7404b	I18
2474	N11	7404c	F22
2475	L10	7404d	F21
2476	N13	7404e	G18
2478	E29	7404f	G17
2480	M3	7405	G21
3401	H21	7406	G22
3402	F4	7407	D19
3403	F4	7408	H19
3404	E3	7409	D22
3405	G3	7410	D24
3406	D5	7411	L2
3407	G5	7412	M4
3408	E6	7413	L20
3409	G6	7415	I21
3410	E8	7416a	M11
3411	G8	7416b	M13
3412	E8	7416c	M14
3413	G8	7416d	E25
3414	E9	7417	N2
3415	G9	7418	N3
3416	D13	7420	E26
3417	H13		
3418	C13		
3419	H13		
3422	B14		
3423	J14		
3424	B14		
3425	J14		
3426	C16		
3427	I16		
3430	C17		
3431	I17		
3432	C18		
3433	I18		
3434	D21		
3435	D21		
3436	D22		
3437	F22		
3438	D22		
3440	D23		
3441	D23		
3442	D23		
3443	G17		
3444	G18		
3445	G20		
3446	G20		
3447	G20		

TRANSMITTER BOARD Component side view



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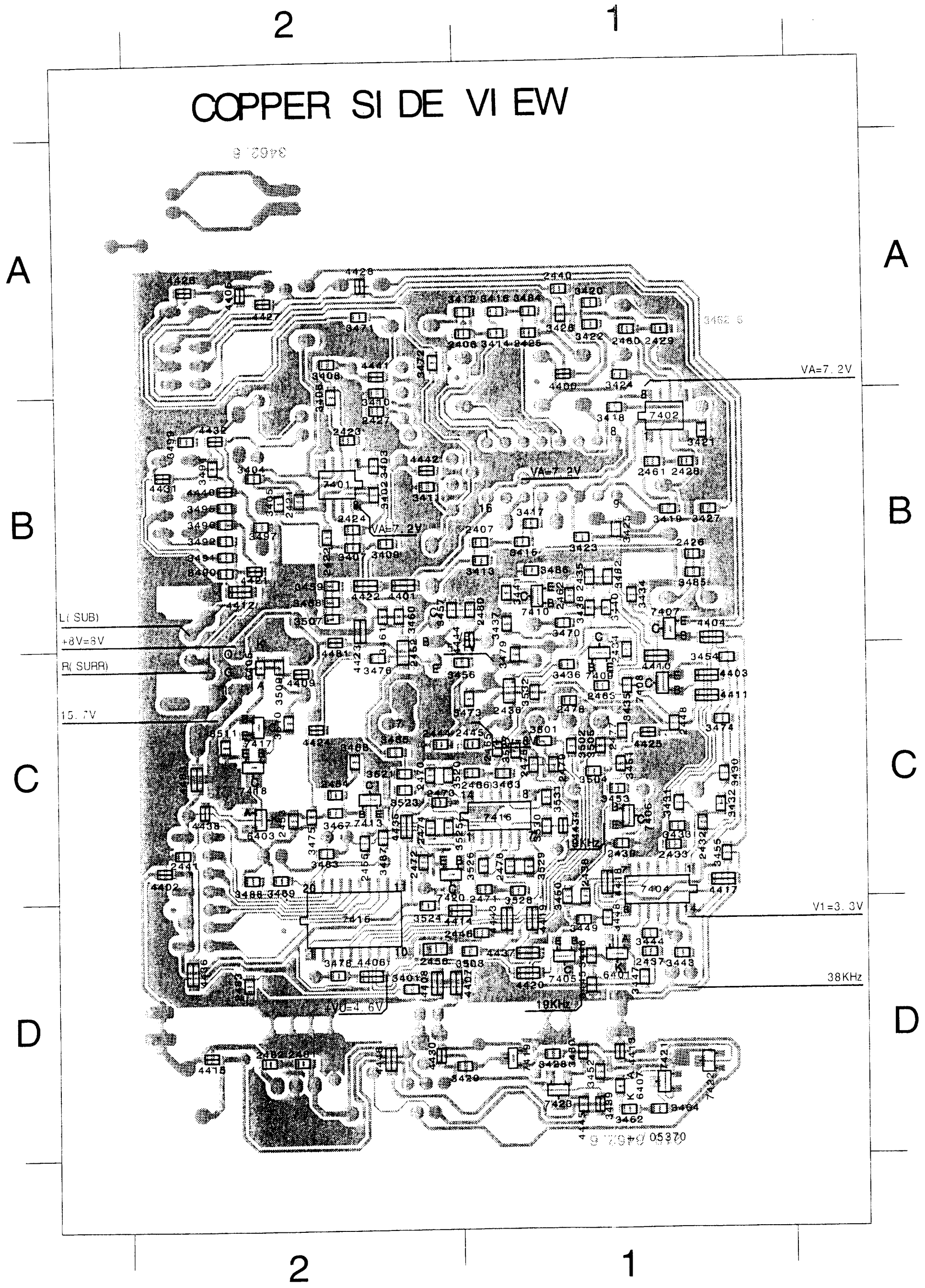
1420	A	2
6404	A	2

1401	B	2
1402	C	2
1403	D	1
1404	D	2
1405	A	2
1406	B	2
1407	D	2
1408	C	2
1411	C	2
1414	C	2
1415	B	2
1419	D	2
2401	A	2
2402	B	2
2403	B	2
2404	A	2
2405	B	2
2408	A	1
2409	B	1
2410	A	1
2411	B	1
2412	B	1
2413	B	1
2414	B	1
2415	B	1
2416	A	1
2417	B	1
2418	A	1
2419	B	1
2420	C	1
2430	A	2
2431	A	2
2442	B	2
2443	C	2
2447	C	1
2449	B	2
3400	D	2
3442	B	1
3477	D	2
5401	A	2
5402	B	2
5403	D	1
7403	B	1
7411	C	2
7412	B	2
7414	D	2

TRANSMITTER BOARD Copper side view



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2407	B	1	3411	B	2	3472	A	2	4414	D	2
2421	B	2	3412	A	1	3473	C	1	4415	D	2
2422	B	2	3413	B	1	3474	C	1	4416	C	2
2423	B	2	3414	A	1	3475	C	2	4417	C	1
2424	B	2	3415	B	1	3476	C	2	4418	C	1
2425	A	1	3416	A	1	3478	D	2	4419	D	1
2426	B	1	3417	B	1	3479	C	1	4420	D	1
2427	B	2	3418	B	1	3480	D	1	4421	B	2
2428	B	1	3419	B	1	3482	B	1	4422	B	2
2429	A	1	3420	A	1	3483	C	2	4423	B	2
2432	C	1	3421	B	1	3484	A	1	4424	C	2
2433	C	1	3422	A	1	3485	B	1	4425	C	1
2434	C	1	3423	B	1	3486	B	1	4426	A	2
2435	B	1	3424	A	1	3487	C	2	4427	A	2
2436	C	1	3425	B	1	3488	C	2	4428	A	2
2437	D	1	3426	A	1	3490	B	2	4430	D	2
2438	C	1	3427	B	1	3491	B	2	4431	B	2
2439	C	1	3428	D	1	3492	B	2	4432	B	2
2440	A	1	3429	D	1	3494	B	2	4433	C	2
2441	C	2	3430	C	1	3495	B	2	4434	C	1
2444	C	2	3431	C	1	3496	B	2	4435	C	2
2445	C	1	3432	C	1	3497	B	2	4436	D	2
2446	D	1	3433	C	1	3499	B	2	4437	D	1
2448	C	1	3434	B	1	3501	C	1	4438	C	2
2452	C	2	3435	C	1	3502	C	1	4440	B	2
2453	C	2	3436	C	1	3503	D	1	4441	A	2
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2472	C	2	3448	D	1	3525	C	2	7401	B	2
2473	C	2	3449	D	1	3526	C	1	7402	B	1
2474	C	2	3450	C	1	3527	C	1	7404	C	1
2475	C	1	3451	C	1	3528	C	1	7405	D	1
2476	C	1	3452	D	1	3529	C	1	7406	C	1
2477	C	1	3453	C	1	3530	C	1	7407	B	1
2478	C	1	3454	C	1	3531	C	1	7408	C	1
2479	C	1	3455	C	1	3532	C	1	7409	C	1
2480	B	1	3456	C	1	4400	A	1	7410	B	1
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2483	D	2	3459	B	2	4403	C	1	7416	C	1
3401	D	2	3460	B	2	4404	B	1	7417	C	2
3402	B	2	3461	B	2	4405	A	2	7418	C	2
3403	B	2	3462	D	1	4406	D	2	7419	D	1
3404	B	2	3463	C	1	4407	D	2	7420	C	2
3405	B	2	3464	D	1	4408	D	2	7421	D	1
3406	B	2	3467	C	2	4409	C	2	7422	D	1
3407	B	2	3468	C	2	4410	C	1	7423	D	1
3408	A	2	3469	C	2	4411	C	1	----		
3409	B	2	3470	B	1	4412	B	2			

ELECTRICAL PARTSLIST TRANSMITTER

MISCELLANEOUS

1401	4822 265 20553	CINCH CONNECTOR
1402	4822 264 30175	SUPPLY CONN. DC
1403	4822 218 11567	TX433MHz only in /00/01/14
1403	4822 218 11574	TX914MHz only in /04
1403	4822 218 11633	TX926MHz only in /10
1404	4822 277 11671	SWITCH 7 POS
1405	4822 277 11668	SWITCH 2 POS
1406	4822 277 11669	SWITCH 3 POS

CAPACITORS

2401	4822 124 41579	10UF 20% 50V
2402	4822 124 40242	1UF 20% 63V
2403	4822 124 40242	1UF 20% 63V
2404	4822 124 40242	1UF 20% 63V
2405	4822 124 40242	1UF 20% 63V
2406	5322 126 10223	4,7NF10%X7R 63V
2407	5322 126 10223	4,7NF10%X7R 63V
2408	4822 124 41579	10UF 20% 50V
2409	4822 124 41579	10UF 20% 50V
2410	4822 124 41576	2,2UF 20% 50V
2411	4822 124 41576	2,2UF 20% 50V
2412	4822 121 51252	470NF 5% 63V
2413	4822 121 51252	470NF 5% 63V
2414	4822 124 41576	2,2UF 20% 50V
2415	4822 124 41576	2,2UF 20% 50V
2416	4822 124 41576	2,2UF 20% 50V
2417	4822 124 41576	2,2UF 20% 50V
2418	4822 124 41579	10UF 20% 50V
2419	4822 124 41579	10UF 20% 50V
2420	4822 124 23624	47UF20% 16V
2421	5322 122 32481	15PF 5% 50V
2422	5322 122 32481	15PF 5% 50V
2423	5322 122 32452	47PF 5%NP0 63V
2424	5322 122 32452	47PF 5%NP0 63V
2425	5322 122 32654	22NF10%X7R 63V
2426	5322 122 32654	22NF10%X7R 63V
2428	5322 122 32452	47PF 5%NP0 63V
2429	5322 122 32452	47PF 5%NP0 63V
2430	4822 124 40242	1UF20% 63V
2431	4822 124 40242	1UF20% 63V
2432	5322 122 32452	47PF 5%NP0 63V
2433	5322 122 32452	47PF 5%NP0 63V
2434	5322 122 32531	100PF 5%NP0 50V
2435	5322 122 32452	47PF 5%NP0 63V
2436	4822 122 33325	470NF 16V
2437	5322 122 34123	1NF10%X7R 50V
2438	5322 122 34123	1NF10%X7R 50V
2439	5322 122 32531	100PF 5%NP0 50V
2441	5322 122 31863	330PF 5%NP0 50V
2442	4822 124 23624	47UF20% 16V
2443	4822 124 23624	47UF20% 16V
2444	5322 122 32531	100PF 5%NP0 50V
2445	5322 122 32452	47PF 5%NP0 63V
2446	4822 126 13061	220NF20% Y5V 25V
2447	4822 124 40196	220UF20% 16V
2448	4822 122 32646	5,6NF10%X7R 50V
2449	4822 124 23624	47UF20% 16V
2452	4822 122 33325	470NF 16V
2453	4822 126 13061	220NF20% Y5V 25V
2454	4822 122 33177	10NF 20% X7R 50V

CAPACITORS

2455	5322 122 32654	22NF10%X7R 63V
2456	4822 123 14018	2U2 10V.10%
2460	5322 122 32452	47PF 5%NP0 63V
2461	5322 122 32452	47PF 5%NP0 63V
2462	5322 122 32531	100PF 5%NP0 50V
2463	5322 122 32531	100PF 5%NP0 50V
2465	4822 126 13838	100NF Y5V 0805 50V P
2466	5322 122 32452	47PF 5%NP0 63V
2470	5322 122 32658	22PF 5% 50V
2471	4822 126 13061	220NF20% Y5V 25V
2472	5322 122 32654	22NF10%X7R 63V
2473	5322 122 32654	22NF10%X7R 63V
2474	5322 122 32658	22PF 5% 50V
2475	4822 126 13838	100NF Y5V 0805 50V P
2476	5322 122 32658	22PF 5% 50V
2478	5322 122 32658	22PF 5% 50V only in /10
2480	4822 126 13061	220NF20% Y5V 25V

RESISTORS

3401	4822 051 20471	470R00 5% 0,1W
3402	4822 051 20223	22K00 5% 0,1W
3403	4822 051 20223	22K00 5% 0,1W
3404	4822 051 20223	22K00 5% 0,1W
3405	4822 051 20223	22K00 5% 0,1W
3406	4822 051 20223	22K00 5% 0,1W
3407	4822 051 20223	22K00 5% 0,1W
3408	4822 117 11449	2K2 1% 0,1W
3409	4822 117 11449	2K2 1% 0,1W
3410	4822 051 20472	4K70 5% 0,1W
3411	4822 051 20472	4K70 5% 0,1W
3412	4822 051 20473	47K00 5% 0,1W
3413	4822 051 20473	47K00 5% 0,1W
3414	4822 051 20153	15K00 5% 0,1W
3415	4822 051 20153	15K00 5% 0,1W
3416	4822 051 20332	3K30 5% 0,1W
3417	4822 051 20332	3K30 5% 0,1W
3418	4822 051 10102	1K00 2% 0,25W
3419	4822 051 10102	1K00 2% 0,25W
3422	4822 051 20183	18K00 5% 0,1W
3423	4822 051 20183	18K00 5% 0,1W
3424	4822 051 20183	18K00 5% 0,1W
3425	4822 051 20183	18K00 5% 0,1W
3426	4822 051 10102	1K00 2% 0,25W
3427	4822 051 10102	1K00 2% 0,25W
3430	4822 051 20473	47K00 5% 0,1W
3431	4822 051 20473	47K00 5% 0,1W
3432	4822 051 20563	56K00 5% 0,1W
3433	4822 051 20563	56K00 5% 0,1W
3434	4822 051 20473	47K00 5% 0,1W
3435	4822 051 20472	4K70 5% 0,1W
3436	4822 117 11449	2K2 1% 0,1W
3437	4822 117 11449	2K2 1% 0,1W
3438	4822 051 20333	33K00 5% 0,1W
3440	4822 117 10833	10K 1% 0,1W
3441	4822 051 20104	100K00 5% 0,1W
3442	4822 100 11348	1K 30%lin 0,1W
3443	4822 051 20105	1M00 5% 0,1W
3444	4822 051 20105	1M00 5% 0,1W
3445	4822 051 20472	4K70 5% 0,1W
3446	4822 117 10833	10K 1% 0,1W
3447	4822 117 10833	10K 1% 0,1W

ELECTRICAL PARTSLIST TRANSMITTER

RESISTORS

3448	4822 051 20104	100K00 5% 0,1W
3449	4822 117 10833	10K 1% 0,1W
3450	4822 051 20104	100K00 5% 0,1W
3451	4822 051 20273	27K00 5% 0,1W
3453	4822 051 20472	4K70 5% 0,1W
3454	4822 117 10833	10K 1% 0,1W
3455	4822 117 10833	10K 1% 0,1W
3456	4822 051 20122	1K20 5% 0,1W
3457	4822 051 20272	2K70 5% 0,1W
3458	4822 117 11503	220R 1% 0.1W
3459	4822 117 11503	220R 1% 0.1W
3460	4822 051 20473	47K00 5% 0,1W
3461	4822 051 20473	47K00 5% 0,1W
3463	4822 051 20333	33K00 5% 0,1W
3465	4822 051 10102	1k 5% 0,1W
3467	4822 051 20473	47K00 5% 0,1W
3468	4822 051 20104	100K00 5% 0,1W
3469	4822 117 10833	10K 1% 0,1W
3471	4822 051 20333	33K00 5% 0,1W
3472	4822 051 20333	33K00 5% 0,1W
3473	4822 051 20122	1K20 5% 0,1W
3474	4822 051 20391	390R00 5% 0,1W
3475	4822 051 20109	10R00 5% 0,1W
3476	4822 051 20159	15R00 5% 0,1W
3478	4822 051 20008	0R00 JUMP. only in /00/01/14
3483	4822 051 20391	390R00 5% 0,1W
3484	4822 117 10833	10K 1% 0,1W
3485	4822 117 10833	10K 1% 0,1W
3486	4822 051 20471	470R00 5% 0,1W
3487	4822 051 20008	0R00 JUMP. (0805)
3490	4822 051 20684	680K00 5% 0,1W
3491	4822 051 20184	180K00 5% 0,1W
3492	4822 051 20272	2K70 5% 0,1W
3494	4822 051 20684	680K00 5% 0,1W
3495	4822 051 20184	180K00 5% 0,1W
3496	4822 051 20272	2K70 5% 0,1W
3497	4822 051 20104	100K00 5% 0,1W
3499	4822 051 20104	100K00 5% 0,1W
3501	4822 051 20471	470R00 5% 0,1W
3502	4822 051 20471	470R00 5% 0,1W
3503	4822 051 20008	0R00 JUMP. (0805)
3505	4822 051 20471	470R00 5% 0,1W
3507	4822 117 11503	220R 1% 0.1W
3509	4822 051 20332	3K30 5% 0,1W
3510	4822 051 20223	22K00 5% 0,1W
3511	4822 051 20473	47K00 5% 0,1W
3520	4822 051 20563	56K00 5% 0,1W
3521	4822 117 10833	10K 1% 0,1W
3523	4822 051 10102	1K00 2% 0,25W
3524	4822 051 20472	4K70 5% 0,1W
3525	4822 051 20474	470K00 5% 0,1W
3526	4822 051 20562	5K60 5% 0,1W
3527	4822 051 20332	3K30 5% 0,1W
3528	4822 117 10833	10K 1% 0,1W
3529	4822 051 20274	270K00 5% 0,1W
3530	4822 117 11449	2K2 1% 0,1W
3531	4822 051 20473	47K00 5% 0,1W
3532	4822 051 20683	68K00 5% 0,1W
4400	4822 051 20008	0R00 JUMP. (0805)
4401	4822 051 10008	0R00 5% 0,25W
4403	4822 051 10008	0R00 5% 0,25W

RESISTORS

4404	4822 051 10008	0R00 5% 0,25W
4406	4822 051 10008	0R00 5% 0,25W
4411	4822 051 10008	0R00 5% 0,25W
4412	4822 051 10008	0R00 5% 0,25W
4414	4822 051 10008	0R00 5% 0,25W
4416	4822 051 10008	0R00 5% 0,25W
4417	4822 051 10008	0R00 5% 0,25W
4418	4822 051 10008	0R00 5% 0,25W
4419	4822 051 10008	0R00 5% 0,25W
4420	4822 051 10008	0R00 5% 0,25W
4422	4822 051 10008	0R00 5% 0,25W
4423	4822 051 10008	0R00 5% 0,25W
4424	4822 051 20008	0R00 JUMP. (0805)
4425	4822 051 20008	0R00 JUMP. (0805)
4429	4822 051 20008	0R00 JUMP. (0805)
4434	4822 051 20008	0R00 JUMP. (0805)
4435	4822 051 10008	0R00 5% 0,25W
4436	4822 051 10008	0R00 5% 0,25W
4437	4822 051 10008	0R00 5% 0,25W
4438	4822 051 20008	0R00 JUMP. (0805)
4440	4822 051 20008	0R00 JUMP. (0805)
4443	4822 051 10008	0R00 5% 0,25W
4444	4822 051 20008	0R00 JUMP. (0805)
4481	4822 051 20008	0R00 JUMP. (0805)

COILS & FILTERS

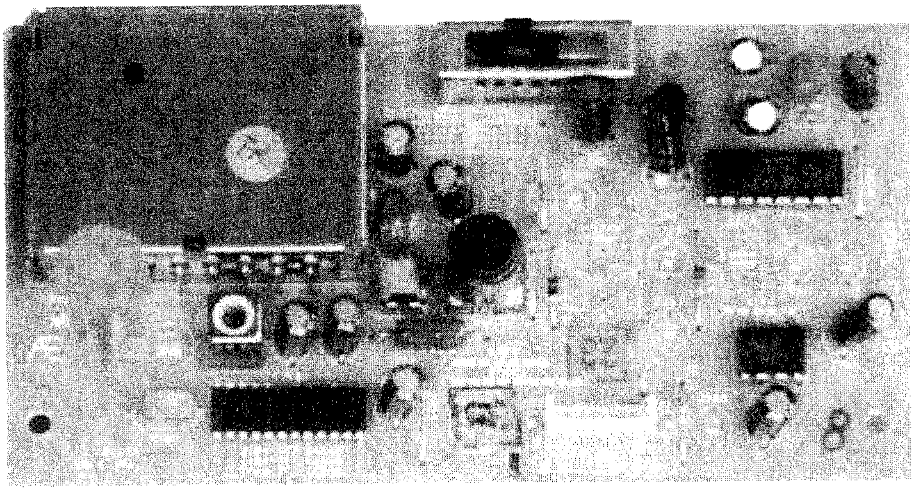
5401	4822 157 63905	MPX FILTER COIL
5402	4822 157 63905	MPX FILTER COIL
5403	4822 242 81014	IT6253J11 (38,OKHZ)

DIODES

6401	5322 130 31928	BAS16
6403	5322 130 31928	BAS16
6404	4822 130 83113	LTL833P
6405	4822 130 10794	BZX284-C10

TRANSISTORS & IC's

7401	4822 209 83357	NJM4560M
7402	4822 209 83357	NJM4560M
7403	5322 209 73938	NE572N
7404	5322 209 11517	PC74HCU04T
7405	5322 130 41982	BC848B
7406	5322 130 41982	BC848B
7407	5322 130 41983	BC858B
7408	5322 130 41983	BC858B
7409	5322 130 41982	BC848B
7410	5322 130 41982	BC848B
7411	4822 209 33083	L7808CV
7412	4822 130 41344	BC337-40
7413	5322 130 41982	BC848B
7415	4822 209 15264	MC68HC05J1 in /00/01/04/14
7415	4822 209 15533	MC68HC05J1 only in /10
7416	4822 209 63709	LM324DTR
7417	5322 130 41982	BC848B
7418	5322 130 41982	BC848B
7420	5322 130 41982	BC848B



RECEIVER

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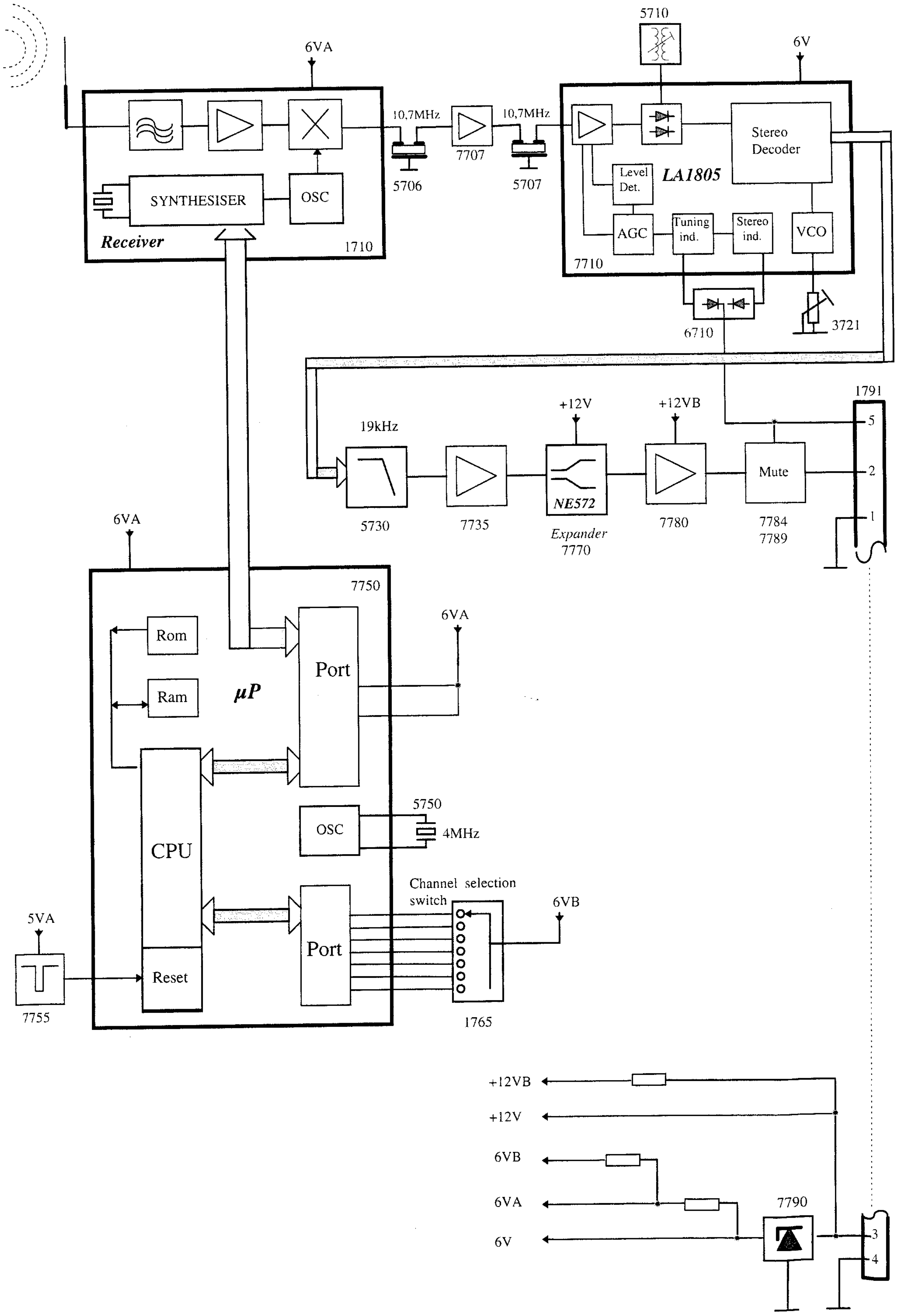
Block Diagram Receiver


6VA
Receiver
SYNTHESISER
OSC
1710
10,7MHz
7707
10,7MHz
5706
5707
5710
6V
Stereo
Decoder
Level
Det.
LA1805
AGC
Tuning
ind.
Stereo
ind.
VCO
7710
6710
3721
1791
+12V
+12VB
19kHz
5
Mute
2
1
5730
7735
NE572
Expander
7770
7780
7784
7789
6VA
7750
Rom
Ram
μP
Port
6VA
CPU
OSC
5750
4MHz
Channel selection
switch
6VB
5VA
Reset
Port
7755
1765
+12VB
+12V
6VB
6VA
6V
7790
3
4

RECEIVER CIRCUIT DESCRIPTION

1. General overview of the total block diagram

We can recognise 4 basic blocks in this diagram :
1-The frontend part (1710): here the incoming 433 MHz aerial signal is filtered with an SAW filter , amplified and converted to a fixed 10.7 MHz IF frequency (normal infradyne system). For this purpose there is a local osc (LO) controlled by a synthesiser circuit below the receiving freq. The freq standard used is a 4MHz quartz crystal .
2-The IF filters/amplifiers and detection circuit (7710): here the converted IF signal is filtered (with 2 standard FM cer filters) , amplified and final IF amplified and detected . There is a stereodecoder part as well in this part . (key radio IC LA1805)
3-The audio processing circuit (7750): here the stereo signal is filtered and expanded in dynamic range , to match the transmitter companding circuit . This circuit uses the NE572 hi-performance circuit with an extra opamp . Basically this circuit multiples the incoming dynamic range with a factor of two (in dB)
4-The microcontroller part: here the local osc in the frontend part is set to the correct frequency via the I^{2}C bus . The controller is programmed to set the 433 MHz or the 914 MHz band execution , dependent on the setting of an option resistor . The only function of the controller is to read the band at start-up and to read permanently the position of the 7-fold frequency switch and send the appropriate I^{2}C code to the synthesiser .

2. Detailed description of frontend operation (1710)

The frontend assy is housed in a separate shielding unit to minimise the local oscillator radiation . There are very tight limits set in the ETSI and FCC standards for the fundamental and harmonic radiation .
There is an antenna connected to the input of the assy . In our case it is a standard wire with a length of $\lambda/4$ (for 433 MHz this corresponds to approx. 17 cm) . The antenna signal picked up by this antenna is first filtered with a SAW filter (5102) . This device is expensive , but offers a low insertion loss and high rejection to out of band signals . For the image freq. (at - 21.4 MHz away) we have a typ rejection of 40 dB. The first RF amplifier is a cascode bipolar transistor configuration with 7101 and 7104 . The advantages of this circuit are high gain , good stability and good noise matching to the SAW filter . In the collector circuit of the upper transistor there is a tuned circuit formed by 5104 /2102 and the load cap. of 7104 and 2107 . Of course this circuit is tuned to 433 (or 914) MHz.
The local oscillator (LO) is formed around the dielectric resonator 5107 and transistor 7103 . One can compare the resonator with a parallel LC circuit (in fact it is a shorted $\lambda/4$ line on ceramic material) . The main advantage is the good stability and high Q of this resonator . The transistor is configured in common-base and the feedback around this transistor is formed by 2119 and 2120 . Note that the resonator is loosely coupled to the collector . The choke 5108 is there only to provide for proper DC biasing . In parallel to the resonator there is a varicap BB135 and a temp compensating cap that compensates for the temperature effect (N750 type) .
The varicap is controlled by the synthesiser loop filter output (Vtune) . The synthesiser used here (TSA5520) is widely used in the video frontend world , therefore the grid for our purpose seems a bit odd (31.25 kHz) . The synthesiser uses a 4MHz ref quartz (5109) that is internally devided to a 31.25 kHz ref. freq. The synthesiser is controllable by either I^{2}C or by a serial bus.
We have used the I^{2}C configuration for compatibility reasons with the transmitter part . Via the I^{2}C the proper settings and required division number is loaded into the 15 bit shiftregister . This chip also has an on board loop amplifier which comes out at pin 10 . Only a few components have to be added to make a proper 2nd order filter .
The mixer circuit of the frontend is formed by transistor 7102 . At the input of this device both aerial and LO signal is injected at the proper level . Due to the device non-linearity an IF signal is extracted with the aid of the tuning circuit 5106 and 2121 . To assure proper conversion gain the base cicuit is earthed for 10.7 MHz with the series resonance circuit 5105 and 2110 .
The total gain from aerial to IF output is approx 40 dB .
Caution is needed as not to damage the SAW filter by ESD voltages ! (ant.input)

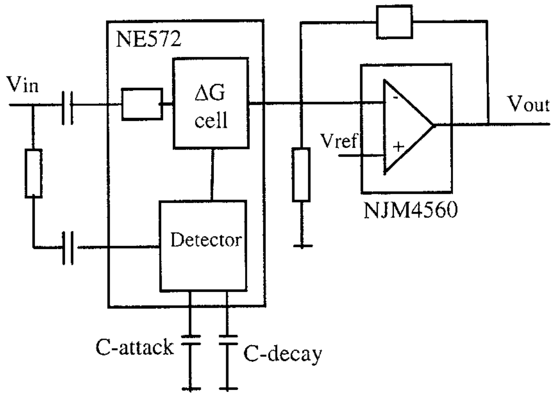
3. Detailed description of the IF and stereodecoder part

In the previous chapter we have seen that we have converted the incoming aerial signal to a fixed 10.7 MHz IF frequency. To make discrimination possible between the 7 channels that can be selected of course some selectivity has to made at the IF channel . We have chosen to use standard SFE10.7MS3 ceramic filters with a transistor in between to have optimal behaviour towards S/N . The gain of this preamp 7707 can be set with the emitter res. 3708 . The total 3 dB bandwidth is approx 160 kHz and the selectivity is not good enough to discriminate between two adjacent channels. Because of the grid of 187.5 kHz (6 times 31.25 kHz) it is obvious that for proper selectivity the neighbour channel can only be at min 2 times 187.5 kHz .
The key radio IC 7710 is the LA1805 . It has a main IF amp, detector , AM part and stereodecoderpart . The AM part is not used here. The IF signal comes in at pin 1 and is boosted by a very high gain to a level where it is suitable for detection . The detector needs a quadrature coil at pin 20 . It has to be aligned for min 2nd harmonic of the modulating signal . The detected signal comes out at pin 17 . Since no birdie filtering is needed for this application we can go straigth to the input of the stereodecoder pin 16 . The stereodecoder is a classic system with a VCO (voltage controlled oscillator) running at 152 kHz . There is a need for adjustment with a potmeter 3721. The divide by 8 signal (19 kHz) is used to phaselock with the incoming pilot signal (typ 9 % of max modulation) . The divide by 4 signal (38 kHz) is used to drive the stereo matrix decoding circuit with outputs at pin 9 and 10 . The loop filter is very simple and is formed by cap. 2715 only . There is an output for a stereo signal flag (pin 7) . This will be used later as one part of an AND function 6710 to drive the mute circuit . In addition the main IF amplifier is capable of delivering a fieldstrength voltage at pin 4 . With proper selection of resistor 3717 one can use this voltage to trigger a comparator that sets the fieldstrength flag at pin 8 . The AF outputs (pin 9 or/and 10) are filtered and amplified before they are presented to the expanding circuit . The filter 5730 is a double notch filter with rej. peaks at 19 and 38 kHz . The driving impedance (4k7) is corrected for with 3731. The load impedance is 2k2 and is formed by transistor 7735 and its biasing resistors.
The amplifier has to deliver 100 mVrms at its output at a deviation with 40 kHz . The gain setting can be adjusted with resistor 3735 . The collector impedance is choosen low because this determines the amplitude response of the AF range . There is a capacitor in parallel with 3735 to slightly boost the high frequencies as to get an as linear as possible amplitude response .

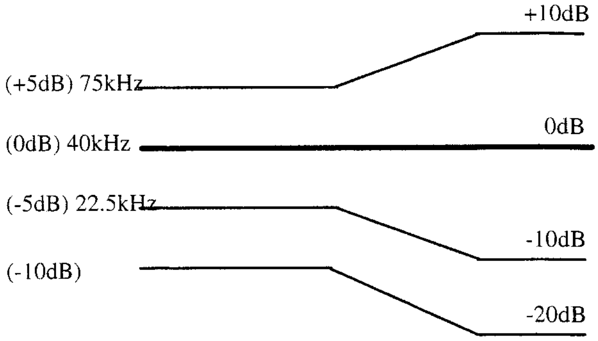
RECEIVER CIRCUIT DESCRIPTION

4. Detailed description of the expander circuit (7770)

The key IC used here is the NE572 compander/expander . We use it here in the expander configuration . To understand better the operation we can draw a block diagram for this part:



One can see that this circuit is in fact a standard opamp circuit where the input series resistor is formed by the ΔG cell . This cell is in fact a variable resistor that is driven by a current that is obtained by rectifying the input current . Any variation of the cell impedance will change the gain of the main opamp NJM4560 . Now the input of the gain cell and the rectifier are tied to the same level . When the input signal Vin drops by eg 6dB , then the gain control current from the rectifier will also decrease with 6dB (factor of 2) . Therefore the total change in Vout will be 12dB , giving in fact a factor 2 (in dB) expansion. The detector circuit rectifies the input signal current . It is important that the attack time is fast and the release (decay) time is slow . This can be set by choosing proper values for the capacitors . The ref. voltage for the opamp is extracted out of the NE572 IC via proper RC elements.
To illustrate the action taking place in the expander the level diagram of the expander is drawn below .

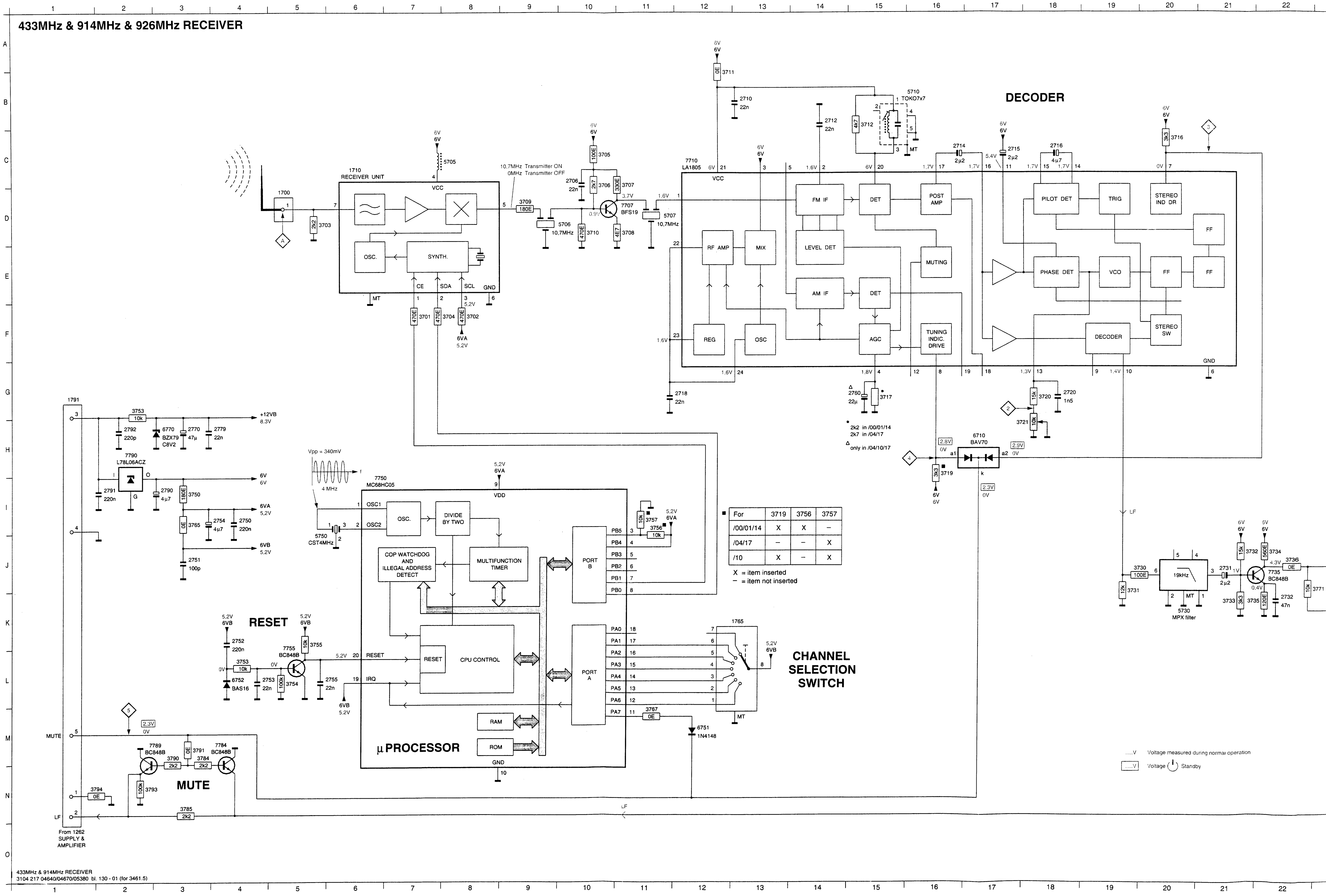


The reference input level for the NE572 IC (0 dB) is set to 100 mVrms by internal design . In our application we have set the 0 dB ref level to a deviation of the signal of 40 kHz .
The output of the opamp is fed to a mute circuit consisting of transistor 7784 and diode 6710 . The diode further serves the function of producing a hi-impedance to the base in normal (non-muted) condition . As a second purpose this diode provides an AND function between the stereo and fieldstrength flag signal . Therefore there is more safety to come out of standby to spurious signals coming via the ether.

5. Description of the microcontroller circuit (7750)

The microcontroller is a MC68HC05 type with 1.2 kbit ROM and 14 I/O lines . The controller is programmed to serve the purpose of both receiver and transmitter . This is recognised by a program option resistor.
The uP clock freq. is derived from a ceramic resonator of 4MHz . The internal clock is divided down to 500kHz internally . There is a resetcircuit available with transistor 7755 to reset at switching on of the supply . For the receiver the main function of the uP is to read the setting of the 7 position slide switch continuously . In an internal look-up table the 7 required frequencies for the LO are stored .
The output towards the synthesiser chip in the front-end is in I^2C format , however there is no real handshaking . Since the synthesiser is the only device on the bus it is not required to do this procedure.

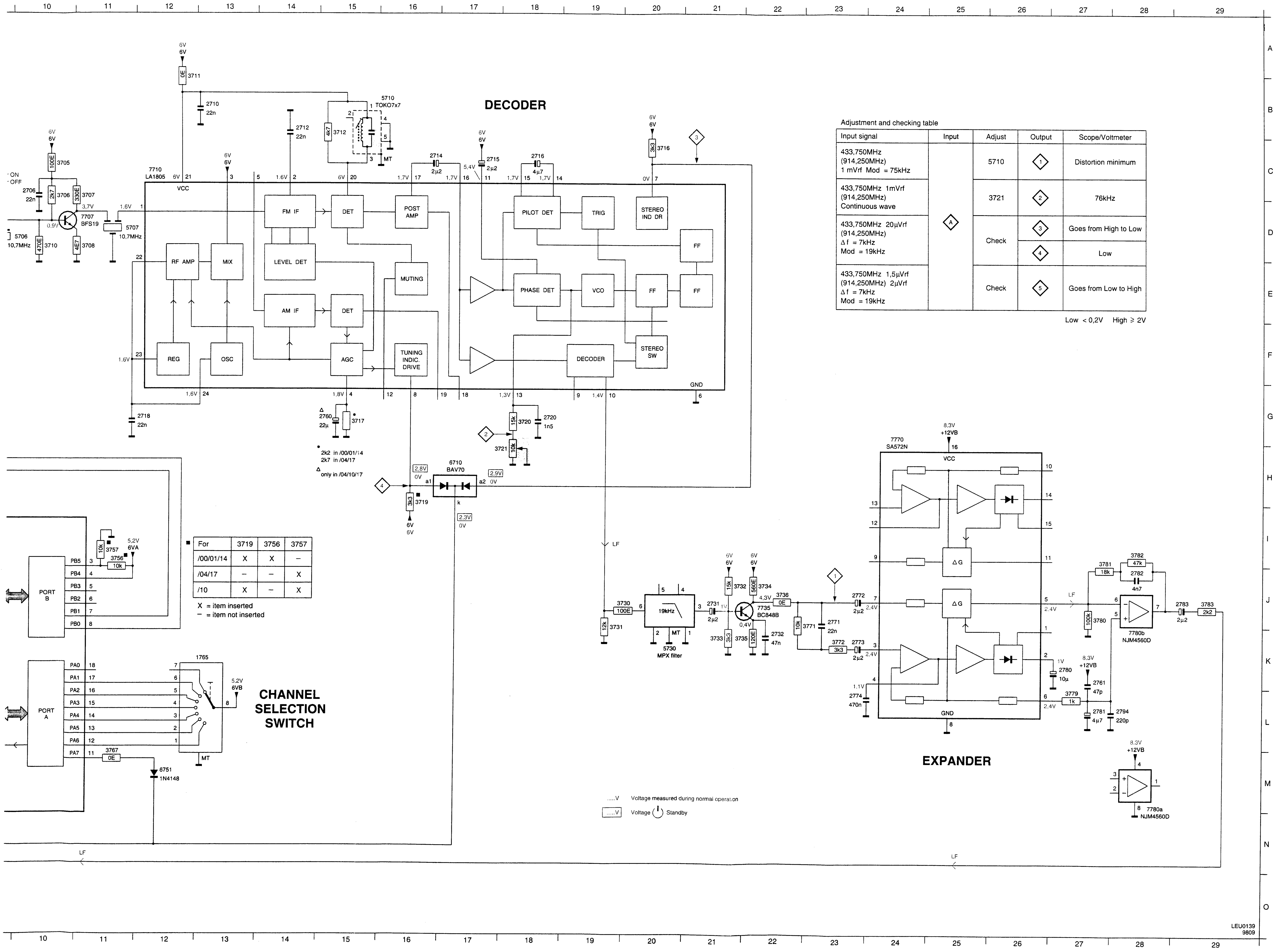
433MHz & 914MHz & 926MHz RECEIVER


1710
RECEIVER UNIT
1700
VCC
OSC.
SYNTH.
CE
SDA
SCL
GND
MT
10,7MHz Transmitter ON
0MHz Transmitter OFF
7707
BFS19
5706
10,7MHz
5707
10,7MHz
5705
3703
3701
3704
3702
3705
3706
3707
3708
3709
3710
3711
DECODER
7710
LA1805
VCC
FM IF
DET
POST AMP
LEVEL DET
RF AMP
MIX
AM IF
MUTING
AGC
REG
OSC
TUNING INDIC. DRIVE
PILOT DET
TRIG
STEREO IND DR
FF
PHASE DET
VCO
DECODER
STEREO SW
GND
5710
TOKO7x7
6710
BAV70
2k2 in /00/01/14
2k7 in /04/17
only in /04/10/17
1791
7790
L78L06ACZ
6770
BZX79
C8V2
+12VB
8,3V
6V
6VA
5,2V
6VB
Vpp = 340mV
4 MHz
5750
CST4MHz
7750
MC68HC05
VDD
OSC.
DIVIDE BY TWO
COP WATCHDOG AND ILLEGAL ADDRESS DETECT
MULTIFUNCTION TIMER
PORT B
PORT A
RESET
CPU CONTROL
IRQ
RAM
ROM
GND
µ PROCESSOR
RESET
7755
BC848B
6752
BAS16
MUTE
7789
BC848B
7784
BC848B
MUTE
LF
From 1262
SUPPLY & AMPLIFIER
1765
CHANNEL SELECTION SWITCH
6751
1N4148
5730
MPX filter
19kHz
7735
BC848B
.....V Voltage measured during normal operation
.....V Voltage Standby

For	3719	3756	3757
/00/01/14	X	X	–
/04/17	–	–	X
/10	X	–	X

X = item inserted
– = item not inserted

433MHz & 914MHz RECEIVER
3104 217 04640/04670/05380 bl. 130 - 01 (for 3461.5)


DECODER
EXPANDER
CHANNEL SELECTION SWITCH
7710
LA1805
VCC
GND
RF AMP
MIX
REG
OSC
FM IF
LEVEL DET
AM IF
DET
AGC
POST AMP
MUTING
TUNING INDIC. DRIVE
PILOT DET
TRIG
STEREO IND DR
PHASE DET
VCO
FF
STEREO SW
DECODER
5710
TOKO7x7
MT
7707
BFS19
5706
10,7MHz
5707
10,7MHz
6710
BAV70
a1
a2
k
7770
SA572N
ΔG
7780b
NJM4560D
7780a
NJM4560D
5730
MPX filter
19kHz
7735
BC848B
1765
6751
1N4148
PORT B
PORT A
PB5
PB4
PB3
PB2
PB1
PB0
PA0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
LF
ON
OFF
+12VB
8,3V
6V
5,2V
6VA
6VB
3711
2710
22n
2712
3712
4k7
2714
2µ2
2715
2716
4µ7
3716
3k3
3705
100E
3706
2k7
3707
330E
3710
470E
3708
4E7
2706
22n
2718
2760
22µ
3717
3720
15k
2720
1n5
3721
10k
3719
3756
3757
10k
3767
0E
3730
100E
3731
12k
2731
3732
15k
3733
3k3
3734
560E
3735
120E
3736
0E
2732
47n
3771
10k
2771
22n
2772
3772
3k3
2773
2774
470n
2780
10µ
2761
47p
2781
4µ7
2794
220p
3779
1k
3780
100k
3781
18k
3782
47k
2782
4n7
2783
2µ2
3783
2k2
2,8V
2,9V
2,3V
0V

Adjustment and checking table

Input signal	Input	Adjust	Output	Scope/Voltmeter
433,750MHz (914,250MHz) 1 mVrf Mod = 75kHz	A	5710	1	Distortion minimum
433,750MHz 1mVrf (914,250MHz) Continuous wave		3721	2	76kHz
433,750MHz 20µVrf (914,250MHz) Δf = 7kHz Mod = 19kHz		Check	3	Goes from High to Low
			4	Low
433,750MHz 1,5µVrf (914,250MHz) 2µVrf Δf = 7kHz Mod = 19kHz		Check	5	Goes from Low to High

Low < 0,2V High ≥ 2V

■

For	3719	3756	3757
/00/01/14	X	X	–
/04/17	–	–	X
/10	X	–	X

X = item inserted
– = item not inserted

• 2k2 in /00/01/14
2k7 in /04/17

Δ only in /04/10/17

.....V Voltage measured during normal operation

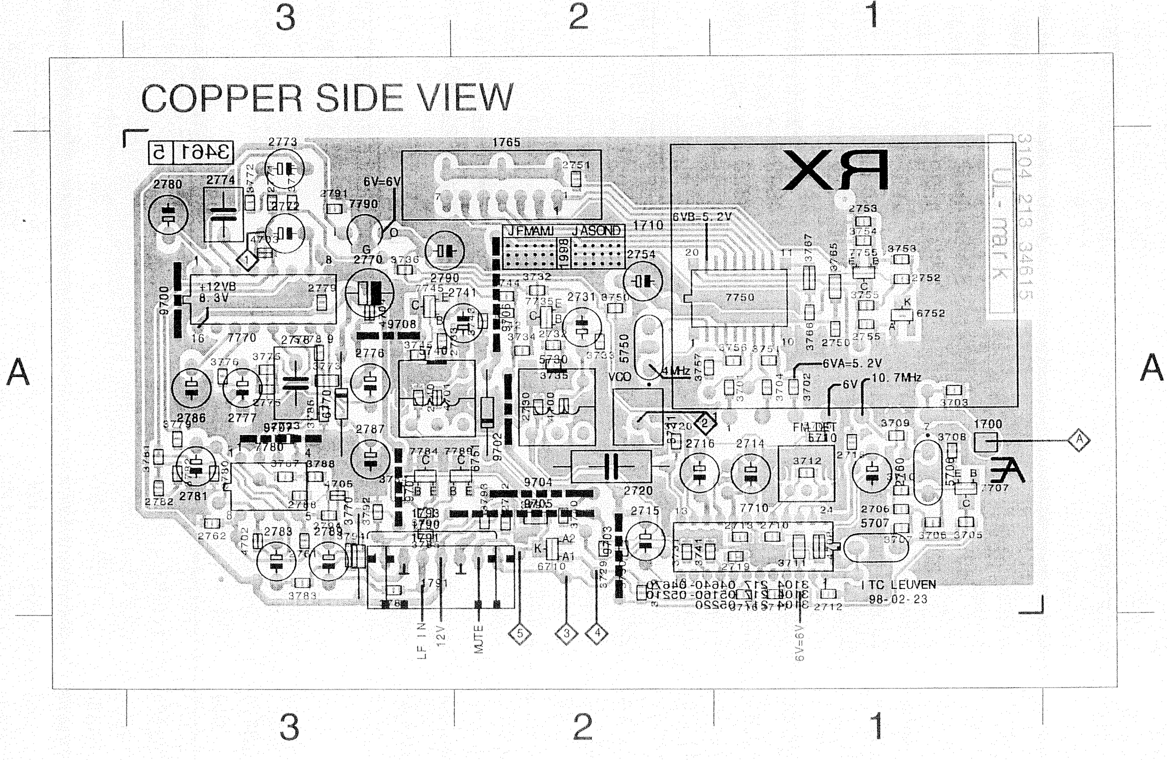
.....V Voltage ⏻ Standby

LEU0139
9809

1700	D5
1710	C6
1765	K12
1791	G1
2706	C10
2710	B13
2712	B14
2714	C16
2715	C17
2716	C18
2718	G12
2720	G18
2731	J21
2732	K22
2750	I4
2751	J3
2752	K4
2753	L4
2754	I4
2755	L5
2760	K27
2761	G15
2770	H3
2771	J23
2772	J23
2773	K23
2774	L23
2779	H4
2780	K27
2781	L27
2782	J28
2783	J29
2790	I3
2791	I2
2792	H2
2794	L28
3701	F7
3702	F8
3703	D5
3704	F8
3705	C10
3706	D10
3707	D11
3708	D11
3709	D9
3710	D10
3711	B12
3712	B15
3716	C20
3717	G15
3719	I16
3720	G18
3721	H17
3730	J19
3731	K19
3732	J21
3733	K21
3734	J22
3735	K21
3736	J22
3750	I3
3753	G2
3753	L4
3754	L5
3755	K5
3756	I11
3757	I11
3765	I3
3767	M11
3771	K22
3772	K23
3779	L27
3780	J27
3781	I27
3782	I28
3783	J29
3784	M3
3785	N3
3790	M3
3791	M3
3793	N2
3794	N1
5705	C8
5706	D9
5707	D11
5710	B16
5730	K20
5750	J5
6710	H17
6751	M12
6752	L4
6770	H3
7707	D11
7710	C12
7735	J22
7750	I6
7755	L5
7770	G24
7780a	M28
7780b	K28
7784	M4
7789	M2
7790	H2

RECEIVER BOARD - Copper side view

Item	Position
1700	A 1
1710	A 1
1765	A 2
1790	A 3
1791	A 3
1793	A 3
2714	A 1
2715	A 2
2716	A 2
2720	A 2
2731	A 2
2741	A 2
2754	A 2
2760	A 1
2770	A 3
2772	A 3
2773	A 3
2774	A 3
2776	A 3
2777	A 3
2778	A 3
2780	A 3
2781	A 3
2783	A 3
2786	A 3
2787	A 3
2789	A 3
2790	A 3
3721	A 2
3770	A 3
5706	A 1
5707	A 1
5710	A 1
5730	A 2
5740	A 3
5750	A 2
6751	A 2
6770	A 3
7710	A 1
7770	A 3
7780	A 3
7790	A 3
9700	A 3
9701	A 3
9702	A 2
9703	A 2
9704	A 2
9705	A 2
9706	A 2
9707	A 3
9708	A 3


3
2
1
A
COPPER SIDE VIEW
3461 5
RX
3104 213 34615
UL-mark
1765
2773
2780
2774
6V=6V
7790
2791
JFMAMJ JASOND
1998
1710
6VB-5.2V
2770
+12VB
8.3V
9700
7770
2776
2786
2777
2781
2783
2787
7784
7786
9702
9704
9705
2720
2715
2731
2754
5750
VCO
4MHz
6VA=5.2V
6V
10.7MHz
FM DET
5710
3712
7750
7710
2716
2714
2706
5707
1700
7707
6752
2752
2753
3709
3708
6710
2712
ITC LEUVEN
98-02-23
LF IN
12V
MUTE
6V=6V

Item	Position
2706	A 1
2710	A 1
2712	A 1
2713	A 1
2718	A 1
2719	A 1
2730	A 2
2732	A 2
2733	A 3
2740	A 3
2750	A 1
2751	A 2
2752	A 1
2753	A 1
2755	A 1
2761	A 3
2762	A 3
2771	A 3
2775	A 3
2779	A 3
2782	A 3
2788	A 3
2791	A 3
2792	A 2
2793	A 3
2794	A 3
3701	A 1
3702	A 1
3703	A 1
3704	A 1
3705	A 1
3706	A 1
3707	A 1
3708	A 1
3709	A 1
3710	A 1
3711	A 1
3712	A 1
3716	A 1
3717	A 1
3719	A 2
3720	A 2
3729	A 2
3730	A 2
3731	A 2
3732	A 2
3733	A 2
3734	A 2
3735	A 2
3736	A 3
3740	A 2
3741	A 2
3742	A 2
3743	A 2
3744	A 2
3745	A 3
3750	A 2
3751	A 1
3753	A 1
3754	A 1
3755	A 1
3756	A 1
3757	A 2
3765	A 1
3766	A 1
3767	A 1
3771	A 3
3772	A 3
3773	A 3
3775	A 3
3776	A 3
3778	A 3
3779	A 3
3780	A 3
3781	A 3
3782	A 3
3783	A 3
3784	A 3
3785	A 3
3786	A 3
3787	A 3
3788	A 3
3789	A 3
3790	A 3
3791	A 2
3792	A 3
3793	A 2
3794	A 3
4700	A 2
4701	A 3
4702	A 3
4703	A 3
4704	A 3
4705	A 3
4708	A 1
5705	A 1
6710	A 2
6752	A 1
7707	A 1
7735	A 2
7745	A 3
7750	A 1
7755	A 1
7784	A 3
7789	A 2

ELECTRICAL PARTS LIST - RECEIVER BOARD

MISCELLANEOUS

1710	4822 218 11568	Rcvr Unit 433MHz /00/01/14
1710	4822 210 10748	Rcvr Unit 926MHz /10/17
1765	4822 277 11671	Channel selection switch

CAPACITORS

2706	5322 122 32654	22nF 10% 63V
2710	5322 122 32654	22nF 10% 63V
2712	5322 122 32654	22nF 10% 63V
2714	4822 124 41576	2,2µF 20% 50V
2715	4822 124 41576	2,2µF 20% 50V
2716	4822 124 40246	4,7µF20% 63V
2718	5322 122 32654	22nF 10% 63V
2720	4822 121 42729	1,5nF 1% 250V
2731	4822 124 41576	2,2µF 20% 50V
2732	4822 122 33797	47nF 20% 50V
2750	4822 126 13061	220nF 20% 25V
2751	5322 122 32531	100pF 5% 50V
2752	4822 126 13061	220nF 20% 25V
2753	5322 122 32654	22nF 10% 63V
2754	4822 124 40246	4,7µF 20% 63V
2755	5322 122 32654	22nF 10% 63V
2760	4822 124 81151	22µF 50V
2761	4822 126 13692	47pF 1% 63V
2770	4822 124 40433	47µF 20% 25V
2771	5322 122 32654	22nF 10% 63V
2772	4822 124 41576	2,2µF 20% 50V
2773	4822 124 41576	2,2µF 20% 50V
2774	4822 121 51252	470nF 5% 63V
2779	5322 122 32654	22nF 10% 63V
2780	4822 124 41579	10µF 20% 50V
2781	4822 124 40246	4,7µF 20% 63V
2782	5322 126 10223	4,7nF 10% 63V
2783	4822 124 41576	2,2µF 20% 50V
2790	4822 124 40246	4,7µF 20% 63V
2791	4822 126 13061	220nF 20% 25V
2792	4822 122 33575	220pF 5% 50V
2794	4822 122 33575	220pF 5% 50V

RESISTORS

3701	4822 051 20471	470R 5% 0,1W
3702	4822 051 20471	470R 5% 0,1W
3703	4822 117 11449	2k2 1% 0,1W
3704	4822 051 20471	470R 5% 0,1W
3705	4822 051 20101	100R 5% 0,1W
3706	4822 117 12955	2K7 1% 0,1W
3707	4822 051 20331	330R 5% 0,1W
3708	4822 051 20478	4R7 5% 0,1W
3709	4822 117 11448	180R 1% 0,1W
3710	4822 051 20471	470R 5% 0,1W
3711	4822 051 10008	0R 5% 0,25W
3712	4822 051 20472	4k7 5% 0,1W
3716	4822 051 20332	3k3 5% 0,1W
3717	4822 117 11449	2k2 1% 0,1W
3719	4822 051 20332	3k3 5% 0,1W
3720	4822 051 20153	15k 5% 0,1W
3721	4822 100 20166	Trimmer 10k 30% 0,1W
3730	4822 051 20101	100R 5% 0,1W
3731	4822 117 11383	12k 1% 0,1W
3732	4822 051 20153	15k 5% 0,1W
3733	4822 051 20332	3k3 5% 0,1W
3734	4822 051 20561	560R 5% 0,1W
3735	4822 051 20121	120R 5% 0,1W
3736	4822 051 20008	0R Jumper 0805
3750	4822 117 11448	180R 1% 0,1W
3753	4822 117 10833	10k 1% 0,1W
3754	4822 051 20104	100k 5% 0,1W
3755	4822 117 10833	10k 1% 0,1W
3756	4822 117 10833	10k 1% 0,1W
3757	4822 117 10833	10k 1% 0,1W
3765	4822 051 10008	0R 5% 0,25W
3767	4822 051 10008	0R 5% 0,25W
3771	4822 117 10833	10k 1% 0,1W
3772	4822 051 20332	3k3 5% 0,1W
3779	4822 051 10102	1k 2% 0,25W
3780	4822 051 20104	100k 5% 0,1W
3781	4822 117 10965	18k 1% 0,1W
3782	4822 117 10834	47k 1% 0,1W
3783	4822 117 11449	2k2 1% 0,1W
3784	4822 117 11449	2k2 1% 0,1W
3785	4822 117 11449	2k2 1% 0,1W
3790	4822 117 11449	2k2 1% 0,1W
3791	4822 051 10008	0R 5% 0,25W
3793	4822 051 20104	100k 5% 0,1W
3794	4822 051 10008	0R 5% 0,25W
4708	4822 051 10008	0R 5% 0,25W

COILS & FILTERS

5705	4822 157 71206	Coil /00/01/14
5705	4822 157 11172	Chip Inductor 68nH /10/17
5706	4822 242 70665	SFE10,7MS3-A
5707	4822 242 70665	SFE10,7MS3-A
5710	4822 157 63904	Q Detection Coil
5730	4822 157 11219	Multiplex Filter Coil
5750	4822 242 72527	CST4,00MGW-TF01

DIODES

6710	5322 130 34331	BAV70
6751	4822 130 30621	1N4148
6752	5322 130 31928	BAS16
6770	4822 130 34382	BZX79-B8V2

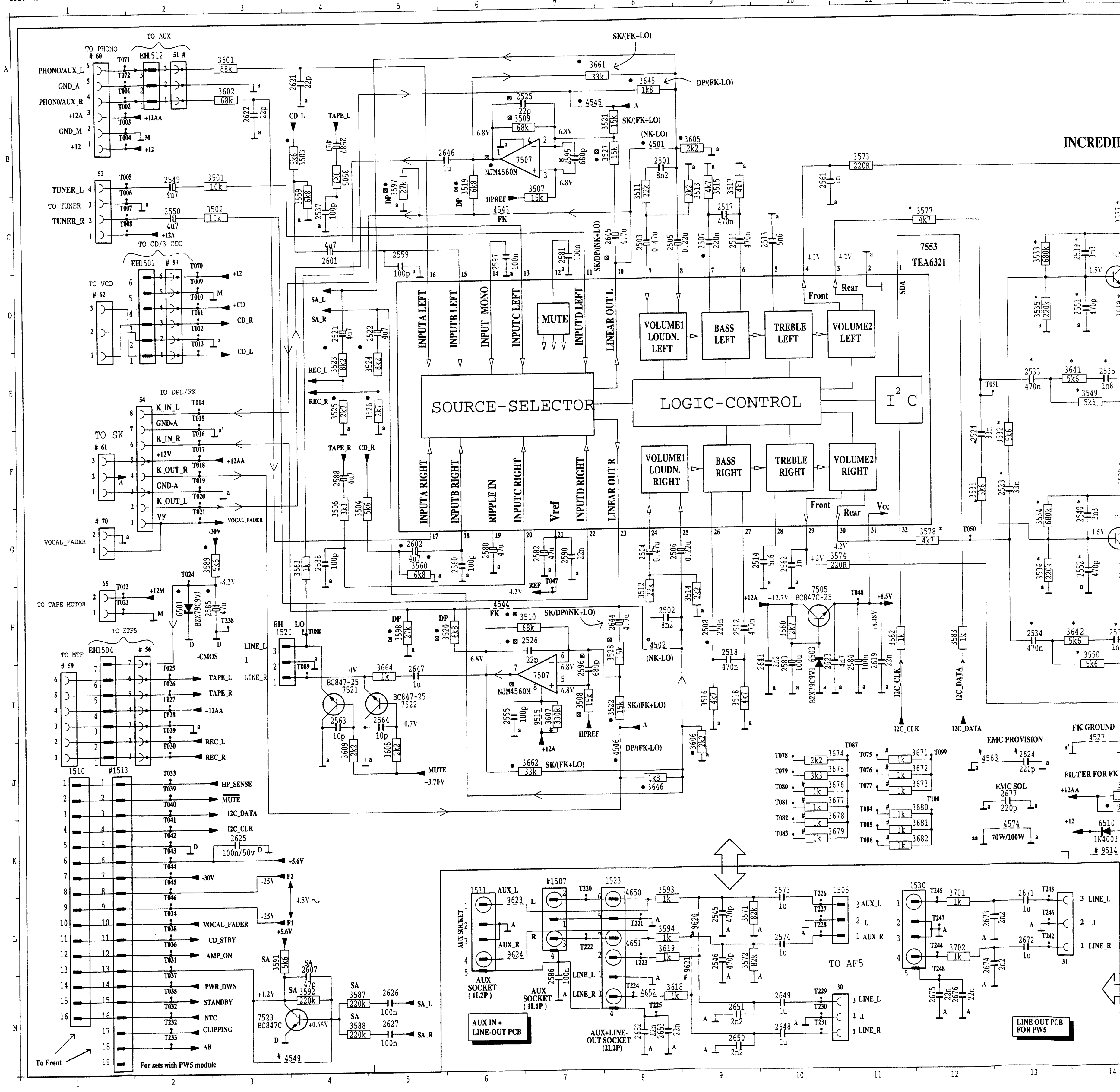
TRANSISTORS & INTEGRATED CIRCUITS

7707	4822 130 42353	BSF19-F2
7710	4822 209 60658	LA1805
7735	5322 130 41982	BC848B
7750	4822 209 15264	MC68HC05J1 ADW. /00/01/14
7750	4822 209 15533	MC68HC705J1A/15533/10/17
7755	5322 130 41982	BC848B
7770	4822 209 31136	SA572N
7780	4822 209 83274	NJM4560D
7784	5322 130 41982	BC848B
7789	5322 130 41982	BC848B
7790	4822 209 15263	L78L06ACZ

Note: Only the parts mentioned in this list are normal service spare parts.

AF5 CIRCUIT DIAGRAM

1501	C 2	1521	J21	2506	G 8	2520	H16	2533	E13	2545	L 9	2558	D20	2582	G 7	2595	B 7	2615	C16	2627	M 5	2645	C 8	2673	L12	3505	B 4	3517	B 9	3529	F18	3541	C15	3553	C15	3565	C18	3578	G12	3591	L 3
1503	J20	1522	I22	2507	C 9	2521	D 4	2534	H13	2546	L 9	2559	C 5	2583	I10	2596	I 7	2616	H16	2630	K17	2646	B 6	2674	L12	3506	G 4	3518	I 9	3530	F18	3542	G15	3554	F15	3566	E18	3579	C22	3592	M 4
1504	H 1	1523	K 8	2508	H 9	2522	D 5	2535	E14	2547	D21	2560	G 6	2584	I11	2597	C 6	2617	E15	2632	J22	2647	I 5	2675	M12	3507	C 7	3519	B 6	3531	F12	3543	D15	3555	C16	3567	C19	3580	H10	3593	L 8
1505	K11	1524	L22	2511	C 9	2523	F13	2536	H14	2548	D21	2561	B10	2585	H 3	2601	C 4	2618	I15	2634	I18	2648	M10	2676	M12	3508	I 7	3520	H 6	3532	F13	3544	G15	3556	I16	3568	E19	3581	C21	3594	L 8
1506	L22	1525	L22	2512	H 9	2524	F12	2537	C 4	2549	B 2	2562	G10	2586	M 7	2602	G 5	2619	I11	2635	H20	2649	M10	2677	J13	3509	B 7	3521	B 8	3533	C13	3545	L16	3557	B17	3569	D19	3582	H11	3595	C21
1507	K 7	1530	K11	2513	C10	2525	A 7	2538	G 4	2550	C 2	2563	I 4	2587	B 4	2603	F18	2620	E18	2636	J18	2650	M 9	2678	D20	3510	H 7	3522	I 8	3534	G13	3546	M15	3558	E17	3570	D19	3583	H12	3596	B20
1508	E21	1531	K 6	2514	G10	2526	H 7	2539	C14	2551	D14	2564	I 5	2588	F 4	2604	K22	2621	A 4	2637	J18	2651	M 9	30	M10	3511	C 8	3523	E 4	3535	D13	3547	M16	3559	C 4	3571	L 9	3584	B18	3597	B 5
1510	J 1	2501	B 8	2515	K17	2527	C17	2540	G14	2552	G14	2573	K10	2590	G 7	2607	L 4	2622	A 3	2638	J20	2652	M 8	31	K13	3512	H 8	3524	E 5	3536	G13	3548	M16	3560	G 5	3572	L 9	3585	C20	3598	H 5
1512	A 2	2502	H 8	2516	J16	2528	D17	2541	C17	2553	F20	2574	L10	2591	C15	2609	D20	2623	I10	2641	I10	2653	M 8	3501	B 3	3513	C 9	3525	E 4	3537	C14	3549	E14	3561	C17	3573	B11	3586	C21	3601	A 3
1513	J 1	2503	C 8	2517	C 9	2529	D18	2542	E17	2554	F19	2575	C20	2592	F15	2610	E20	2624	J13	2642	I19	2654	J16	3502	C 3	3514	H 9	3526	E 5	3538	F14	3550	I14	3562	D17	3574	G11	3587	M 4	3602	A 3
1516	D22	2504	G 8	2518	H 9	2531	B17	2543	C19	2555	I 6	2580	G 6	2593	D15	2611	B18	2625	K 3	2643	F18	2671	L13	3503	B 4	3515	B 9	3527	B 8	3539	D14	3551	E15	3563	B18	3575	I15	3588	M 4	3603	D16
1520	H 4	2505	C 8	2519	E16	2532	E17	2544	E19	2557	D20	2581	C 7	2594	G15	2612	E18	2626	M 5	2644	H 8	2672	L13	3504	G 4	3516	I 9	3528	H 8	3540	G14	3552	I15	3564	F18	3577	C12	3589	G 2	3604	H16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11
12
13
14
A
B
C
D
E
F
G
H
I
J
K
L
M
TO PHONO
TO AUX
# 60
EH1512
51 #
PHONO/AUX_L
GND_A
PHONO/AUX_R
+12A
GND_M
+12
TUNER_L
TO TUNER
TUNER_R
TO CD/3-CDC
EH1501
# 53
TO VCD
# 62
+CD
CD_R
CD_L
TO DPL/FK
K_IN_L
GND-A
K_IN_R
+12V
K_OUT_R
GND-A
K_OUT_L
VF
TO SK
# 61
+12AA
VOCAL_FADER
# 70
TO TAPE MOTOR
TO ETF5
TO MTP
EH1504
# 59
# 56
TAPE_L
TAPE_R
REC_L
REC_R
-CMOS
1510
#1513
HP_SENSE
MUTE
I2C_DATA
I2C_CLK
+5.6V
-30V
VOCAL_FADER
CD_STBY
AMP_ON
PWR_DWN
STANDBY
NTC
CLIPPING
AB
To Front
For sets with PWS module
SK/(FK+LO)
DP/(FK-LO)
(NK-LO)
SK/DP/(NK+LO)
NJM4560M
7507
HPREF
FK
INPUT A LEFT
INPUTB LEFT
INPUT MONO
INPUTC LEFT
MUTE
INPUTD LEFT
LINEAR OUT L
SOURCE-SELECTOR
LOGIC-CONTROL
I²C
VOLUME1 LOUDN. LEFT
BASS LEFT
TREBLE LEFT
VOLUME2 LEFT
VOLUME1 LOUDN. RIGHT
BASS RIGHT
TREBLE RIGHT
VOLUME2 RIGHT
INPUTA RIGHT
INPUTB RIGHT
RIPPLE IN
INPUTC RIGHT
Vref
INPUTD RIGHT
LINEAR OUT R
Front
Rear
Vcc
SDA
7553
TEA6321
SA_L
SA_R
REC_L
REC_R
TAPE_L
TAPE_R
CD_L
CD_R
DP
REF
BC847-25
7521
7522
BC847C-25
7505
BZX79C9V1
I2C_CLK
I2C_DATA
EMC PROVISION
EMC SOL
70W/100W
FK GROUND
FILTER FOR FK
1N4003
INCREDI
LINE_L
LINE_R
EH 1520 LO
7523
BC847C
AUX SOCKET
AUX SOCKET (1L2P)
AUX SOCKET (1L1P)
AUX+LINE-OUT SOCKET (2L2P)
AUX IN + LINE-OUT PCB
#1507
1523
1505
AUX_L
AUX_R
TO AF5
1530
LINE_L
LINE_R
LINE OUT PCB FOR PWS

4650
4651 } Used when 1507 OR 1523 is used

1531
9623
9624 } For Power 5 Only

9620
9621 } Provision for Dual Aux-In

1501	C 2	1521	J21	2506	G 8	2520	H16	2533	E13	2545	L 9
1503	J20	1522	I22	2507	C 9	2521	D 4	2534	H13	2546	L 9
1504	H 1	1523	K 8	2508	H 9	2522	D 5	2535	E14	2547	D21
1505	K11	1524	L22	2511	C 9	2523	F13	2536	H14	2548	D21
1506	L22	1525	L22	2512	H 9	2524	F12	2537	C 4	2549	B 2
1507	K 7	1530	K11	2513	C10	2525	A 7	2538	G 4	2550	C 2
1508	E21	1531	K 6	2514	G10	2526	H 7	2539	C14	2551	D14
1510	J 1	2501	B 8	2515	K17	2527	C17	2540	G14	2552	G14
1512	A 2	2502	H 8	2516	J16	2528	D17	2541	C17	2553	F20
1513	J 1	2503	C 8	2517	C 9	2529	D18	2542	E17	2554	F19
1516	D22	2504	G 8	2518	H 9	2531	B17	2543	C19	2555	I 6
1520	H 4	2505	C 8	2519	E16	2532	E17	2544	E19	2557	D20

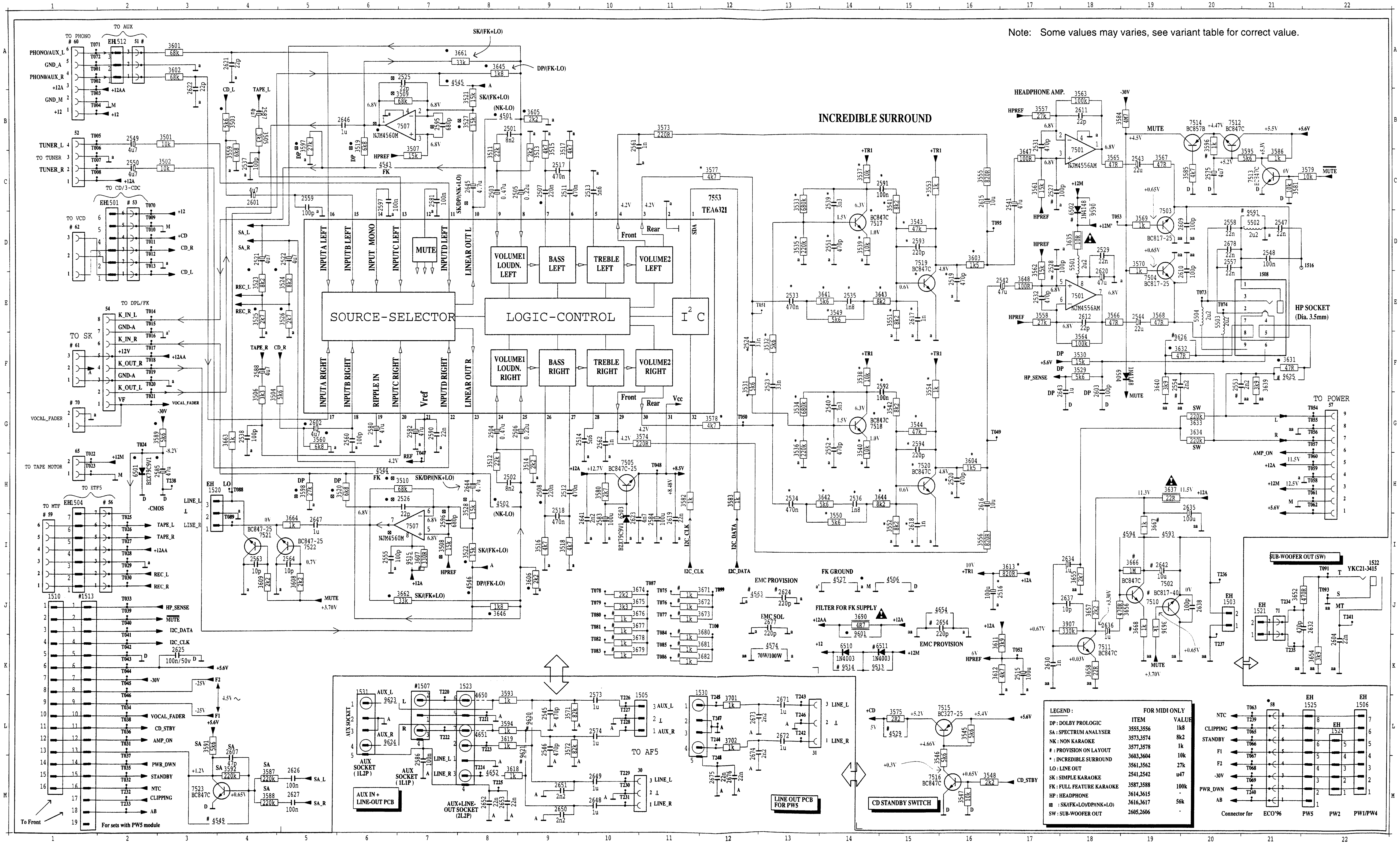
2558	D20	2582	G 7	2595	B 7	2615	C16	2627	M 5	2645	C 8
2559	C 5	2583	I10	2596	I 7	2616	H16	2630	K17	2646	B 6
2560	G 6	2584	I11	2597	C 6	2617	E15	2632	J22	2647	I 5
2561	B10	2585	H 3	2601	C 4	2618	I15	2634	I18	2648	M10
2562	G10	2586	M 7	2602	G 5	2619	I11	2635	H20	2649	M10
2563	I 4	2587	B 4	2603	F18	2620	E18	2636	J18	2650	M 9
2564	I 5	2588	F 4	2604	K22	2621	A 4	2637	J18	2651	M 9
2573	K10	2590	G 7	2607	L 4	2622	A 3	2638	J20	2652	M 8
2574	L10	2591	C15	2609	D20	2623	I10	2641	I10	2653	M 8
2575	C20	2592	F15	2610	E20	2624	J13	2642	I19	2654	J16
2580	G 6	2593	D15	2611	B18	2625	K 3	2643	F18	2671	L13
2581	C 7	2594	G15	2612	E18	2626	M 5	2644	H 8	2672	L13

2673	L12	3505	B 4	3517	B 9	3529	F18	3541	C15	3553	C15
2674	L12	3506	G 4	3518	I 9	3530	F18	3542	G15	3554	F15
2675	M12	3507	C 7	3519	B 6	3531	F12	3543	D15	3555	C16
2676	M12	3508	I 7	3520	H 6	3532	F13	3544	G15	3556	I16
2677	J13	3509	B 7	3521	B 8	3533	C13	3545	L16	3557	B17
2678	D20	3510	H 7	3522	I 8	3534	G13	3546	M15	3558	E17
30	M10	3511	C 8	3523	E 4	3535	D13	3547	M16	3559	C 4
31	K13	3512	H 8	3524	E 5	3536	G13	3548	M16	3560	G 5
3501	B 3	3513	C 9	3525	E 4	3537	C14	3549	E14	3561	C17
3502	C 3	3514	H 9	3526	E 5	3538	F14	3550	I14	3562	D17
3503	B 4	3515	B 9	3527	B 8	3539	D14	3551	E15	3563	B18
3504	G 4	3516	I 9	3528	H 8	3540	G14	3552	I15	3564	F18

3565	C18	3578	G12	3591	L 3	3605	B 9	3633	G20	3646	J 8
3566	E18	3579	C22	3592	M 4	3606	J 9	3634	G20	3647	C17
3567	C19	3580	H10	3593	L 8	3607	I 7	3635	D18	3648	E17
3568	E19	3581	C21	3594	L 8	3608	J 5	3636	J19	3652	J21
3569	D19	3582	H11	3595	C21	3609	J 4	3637	H19	3654	K22
3570	D19	3583	H12	3596	B20	3611	K16	3639	F21	3655	J18
3571	L 9	3584	B18	3597	B 5	3612	K16	3640	F19	3656	J19
3572	L 9	3585	C20	3598	H 5	3613	I17	3641	E14	3657	J18
3573	B11	3586	C21	3601	A 3	3618	M 8	3642	H14	3658	K18
3574	G11	3587	M 4	3602	A 3	3619	L 8	3643	E15	3661	A 8
3575	L15	3588	M 4	3603	D16	3631	F21	3644	H15	3662	J 7
3577	C12	3589	G 2	3604	H16	3632	F19	3645	A 8	3663	G 4

3664	I 5	3679	K10	4529	L15	4652	M 8	58	L21	70	G 1
3666	I19	3680	J12	4543	C 6	4654	J16	59	I 1	71	J21
3667	I19	3681	K12	4544	H 6	51	A 2	60	A 1	7501	B18
3668	J19	3682	K12	4545	A 7	52	B 1	61	F 1	7501	E18
3671	J12	3690	J14	4546	J 8	53	C 2	62	D 1	7502	J19
3672	J12	3701	L12	4549	M 4	54	E 2	65	G 1	7503	D19
3673	J12	3702	L12	4563	J12	5501	D18	6501	H 2	7504	E19
3674	J10	3907	J18	4574	K13	5502	D21	6502	C18	7505	H10
3675	J10	4501	B 8	4593	I19	5503	E20	6503	H10	7507	B 6
3676	J10	4502	H 8	4594	I19	5504	E20	6504	F19	7507	I 7
3677	J10	4506	J15	4650	L 8	56	H 2	6510	K14	7510	J19
3678	K10	4527	J14	4651	L 8	57	G22	6511	K15	7511	K18

7512	B20	7553	C12	9626	F19
7513	C21	9513	K14		
7514	B20	9514	K14		
7515	L15	9515	I 7		
7516	M15	9590	C18		
7517	D15	9591	D21		
7518	G15	9601	J14		
7519	D15	9620	L 9		
7520	H15	9621	L 9		
7521	I 4	9623	L 6		
7522	I 5	9624	L 6		
7523	M 3	9625	F21		


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
A B C D E F G H I J K L M
TO PHONO
TO AUX
PHONO/AUX_L
GND_A
PHONO/AUX_R
+12A
GND_M
+12
TUNER_L
TO TUNER
TUNER_R
TO CD/3-CDC
TO VCD
TO SK
TO DPL/FK
K_IN_L
GND-A
K_IN_R
+12V
K_OUT_R
GND-A
K_OUT_L
VF
VOCAL_FADER
TO TAPE MOTOR
TO ETF5
TO MTP
TAPE_L
TAPE_R
REC_L
REC_R
HP_SENSE
MUTE
I2C_DATA
I2C_CLK
VOCAL_FADER
CD_STBY
AMP_ON
PWR_DWN
STANDBY
NTC
CLIPPING
AB
To Front
For sets with PW5 module
SK/(FK+LO)
DP/(FK-LO)
NJM4560M
7507
7553
TEA6321
INPUTA LEFT
INPUTB LEFT
INPUT MONO
INPUTC LEFT
MUTE
INPUTD LEFT
LINEAR OUT L
VOLUME1 LOUDN. LEFT
BASS LEFT
TREBLE LEFT
VOLUME2 LEFT
Front
Rear
SDA
SOURCE-SELECTOR
LOGIC-CONTROL
I2C
INPUTA RIGHT
INPUTB RIGHT
RIPPLE IN
INPUTC RIGHT
Vref
INPUTD RIGHT
LINEAR OUT R
VOLUME1 LOUDN. RIGHT
BASS RIGHT
TREBLE RIGHT
VOLUME2 RIGHT
Vcc
INCREDIBLE SURROUND
BC847C
HEADPHONE AMP.
NJM4556AM
HPREF
HP SOCKET (Dia. 3.5mm)
TO POWER
SW
AMP_ON
SUB-WOOFER OUT (SW)
YKC21-3415
FK GROUND
EMC PROVISION
FILTER FOR FK SUPPLY
EMC SOL
70W/100W
1N4003
AUX SOCKET
AUX SOCKET (1L2P)
AUX IN + LINE-OUT PCB
AUX+LINE-OUT SOCKET (2L2P)
TO AF5
LINE_L
LINE_R
LINE OUT PCB FOR PW5
CD STANDBY SWITCH
BC327-25
Connector for
ECO'96
PW5
PW2
PW1/PW4

Note: Some values may varies, see variant table for correct value.

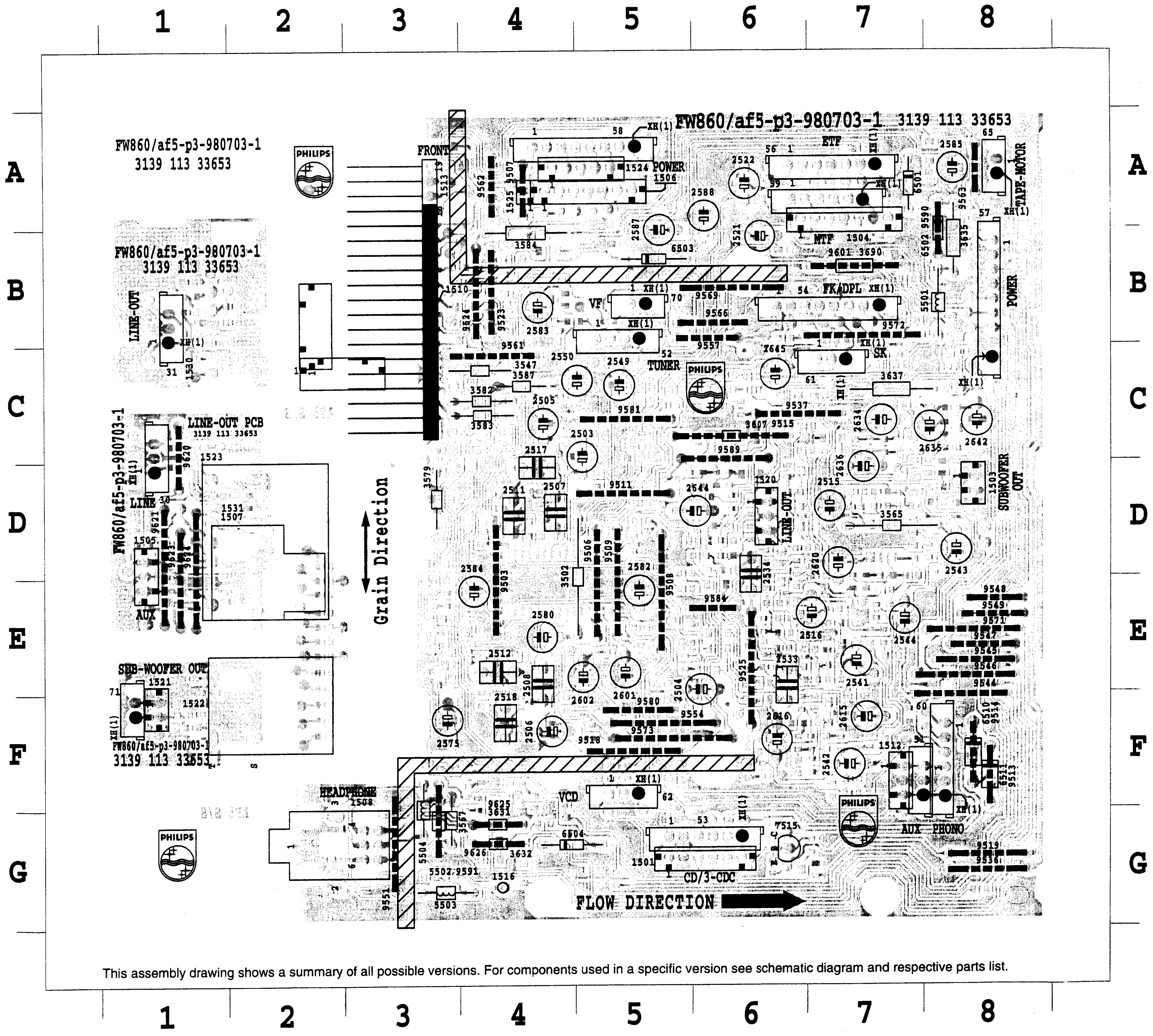
LEGEND :	FOR MIDI ONLY ITEM	VALUE
DP : DOLBY PROLOGIC	3555,3556	1k8
SA : SPECTRUM ANALYSER	3573,3574	8k2
NK : NON KARAOKE	3577,3578	1k
# : PROVISION ON LAYOUT	3603,3604	10k
* : INCREDIBLE SURROUND	3561,3562	27k
LO : LINE OUT	2541,2542	u47
SK : SIMPLE KARAOKE	3587,3588	100k
FK : FULL FEATURE KARAOKE	3614,3615	-
HP : HEADPHONE	3616,3617	56k
☒ : SK/(FK+LO)/DP/(NK+LO)	2605,2606	-
SW : SUB-WOOFER OUT		

4650 4651 } Used when 1507 OR 1523 is used

1531 9623 9624 } For Power 5 Only

9620 9621 } Provision for Dual Aux-In

AF5 BOARD - COMPONENT LAYOUT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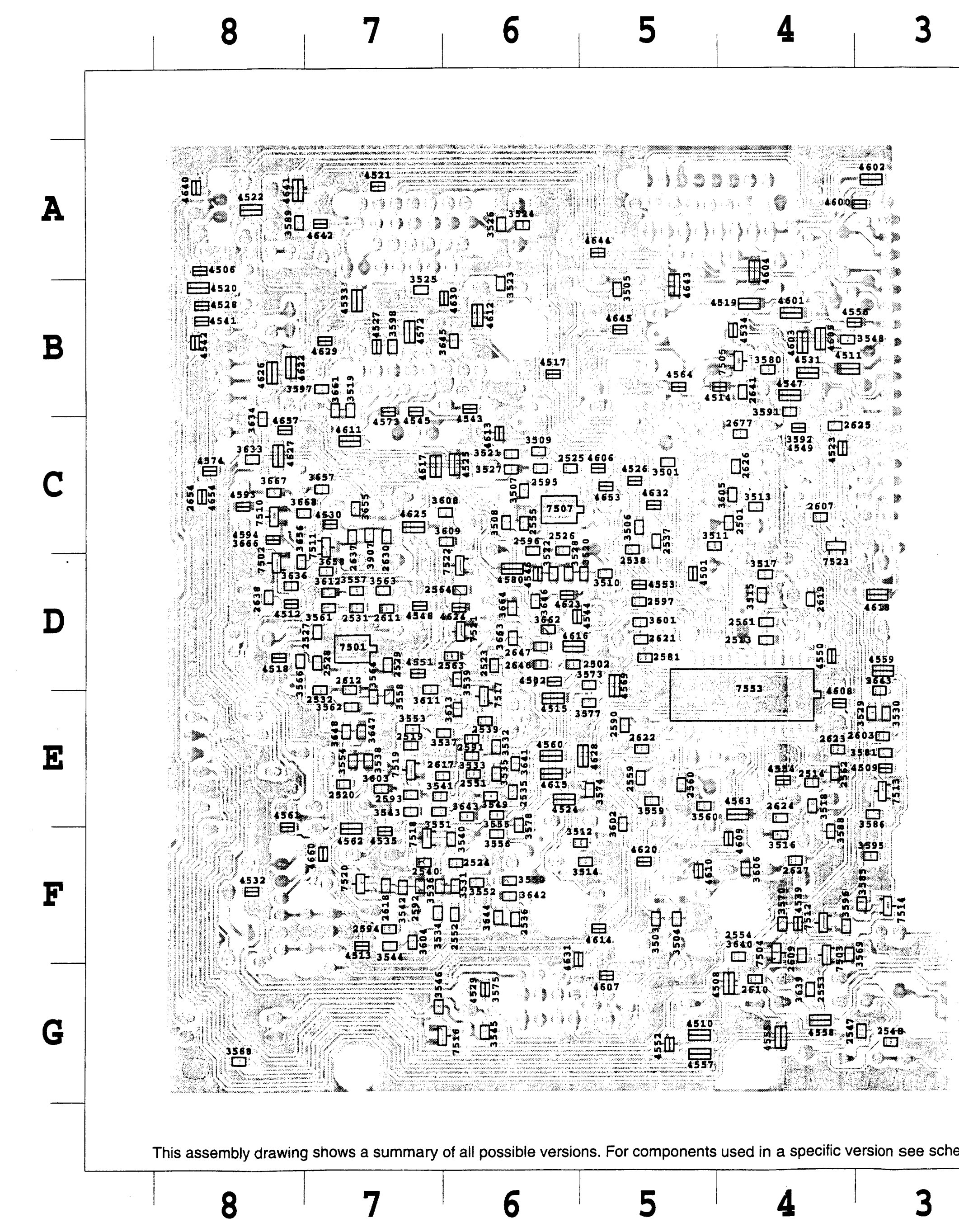
FW860/af5-p3-980703-1
3139 113 33653
PHILIPS
LINE-OUT
LINE-OUT PCB
AUX
SUB-WOOFER OUT
HEADPHONE
FRONT
POWER
ETF
MTF
FRADPL
SK
VF
TUNER
TAPE-MOTOR
SUBWOOFER OUT
Grain Direction
VCD
CD/3-CDC
AUX PHONO
FLOW DIRECTION

This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

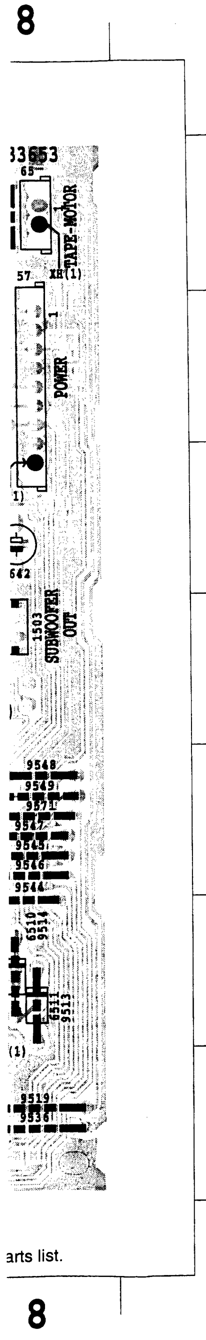
30	C	1	2580	E	4	9536	G	8
31	B	1	2582	E	5	9537	C	6
51	F	7	2583	B	4	9544	F	8
52	B	5	2584	E	4	9545	E	8
53	G	6	2585	A	8	9546	E	8
54	B	7	2587	B	5	9547	E	8
56	A	7	2588	A	6	9548	E	8
57	B	8	2601	E	5	9549	E	8
58	A	5	2602	E	5	9551	G	3
59	A	7	2615	F	7	9554	F	5
60	F	8	2616	F	6	9557	B	6
61	C	7	2620	D	7	9561	C	4
62	F	5	2634	C	7	9562	A	4
65	A	8	2635	C	8	9563	A	8
70	B	5	2636	D	7	9566	B	6
71	F	1	2642	C	8	9569	B	6
1501	G	6	2644	D	6	9571	E	8
1503	D	8	2645	C	6	9572	B	7
1504	A	7	3502	E	5	9573	F	5
1505	D	1	3547	C	4	9580	F	5
1506	A	5	3565	D	7	9581	C	5
1507	E	2	3567	G	3	9584	E	6
1508	G	2	3579	D	3	9589	C	6
1510	B	3	3582	C	4	9590	B	8
1512	F	7	3583	C	4	9591	G	3
1513	B	3	3584	B	4	9601	B	7
1516	G	4	3587	C	4	9620	C	1
1520	D	6	3607	C	6	9621	D	1
1521	F	1	3631	G	4	9623	E	1
1522	F	2	3632	G	4	9624	D	1
1523	D	2	3635	B	8	9625	G	4
1524	A	5	3637	C	7	9626	G	4
1525	A	5	3690	B	7			
1530	B	2	5501	B	8			
1531	C	2	5502	G	3			
2503	C	5	5503	G	3			
2504	E	6	5504	G	3			
2505	C	4	6501	A	7			
2506	F	4	6502	B	8			
2507	D	4	6503	B	5			
2508	E	4	6504	G	4			
2511	D	4	6510	F	8			
2512	E	4	6511	F	8			
2515	D	7	7515	G	6			
2516	E	7	9503	E	4			
2517	D	4	9506	E	5			
2518	F	4	9507	A	4			
2521	B	6	9508	E	5			
2522	A	6	9509	E	5			
2533	E	6	9511	D	5			
2534	D	6	9513	F	8			
2541	E	7	9514	F	8			
2542	F	7	9515	C	6			
2543	D	8	9518	F	5			
2544	E	7	9519	G	8			
2549	C	5	9523	B	4			
2550	C	5	9524	B	4			
2575	F	3	9525	E	6			

AF5 BOARD - CHIP LAYOUT


8
7
6
5
4
3
A
B
C
D
E
F
G
7553
7507
7501

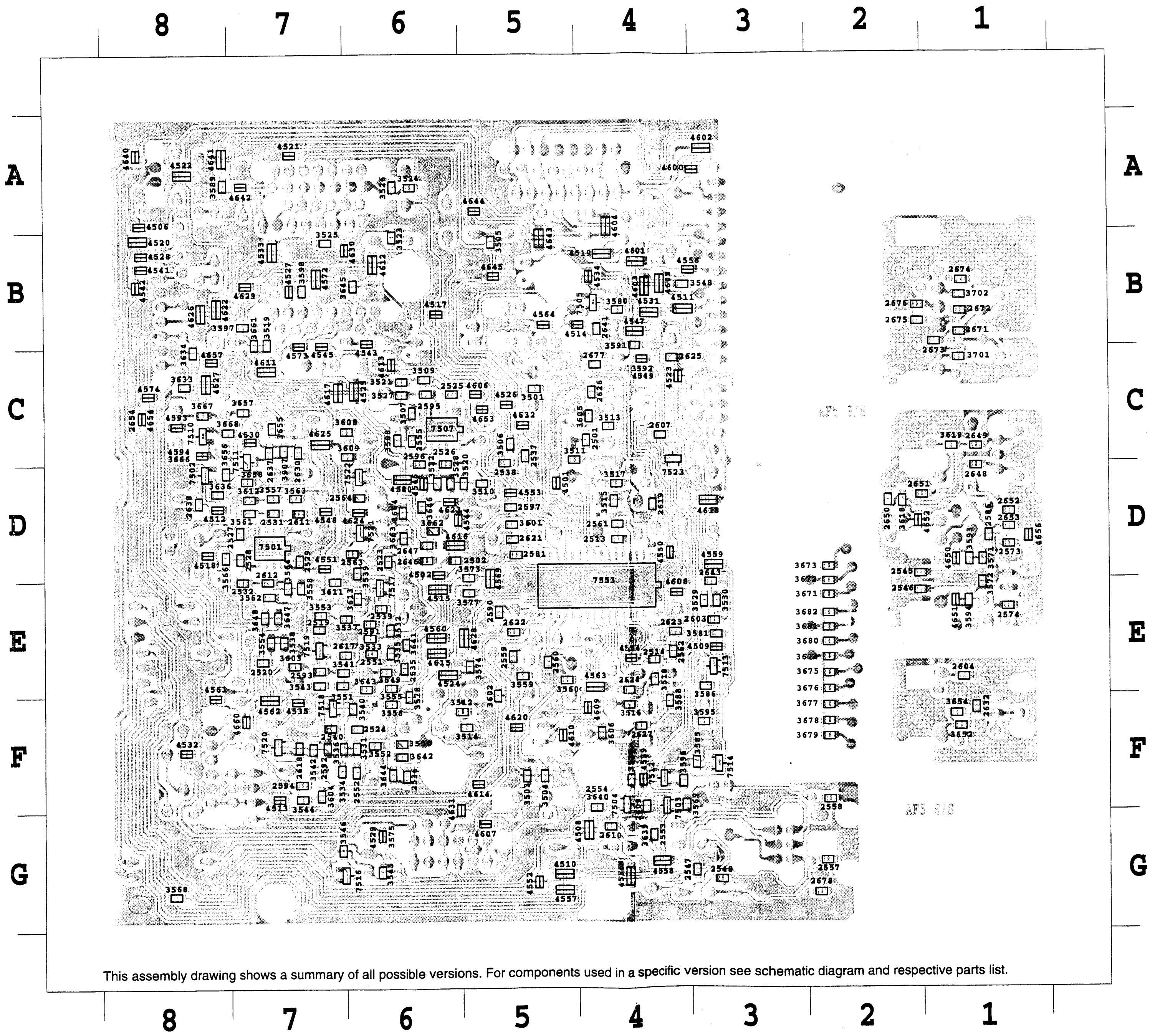
This assembly drawing shows a summary of all possible versions. For components used in a specific version see sche

AF5 BOARD - CHIP LAYOUT



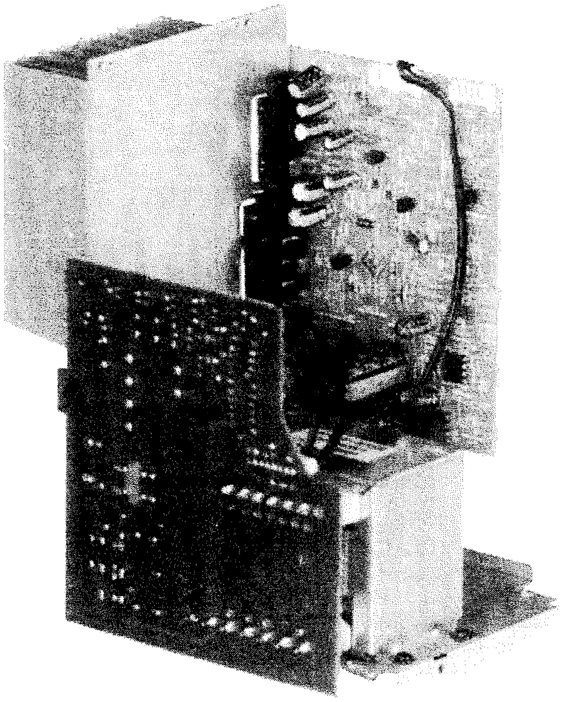
arts list.

30 C 1	2580 E 4	9536 G 8
31 B 1	2582 E 5	9537 C 6
51 F 7	2583 B 4	9544 F 8
52 B 5	2584 E 4	9545 E 8
53 G 6	2585 A 8	9546 E 8
54 B 7	2587 B 5	9547 E 8
56 A 7	2588 A 6	9548 E 8
57 B 8	2601 E 5	9549 E 8
58 A 5	2602 E 5	9551 G 3
59 A 7	2615 F 7	9554 F 5
60 F 8	2616 F 6	9557 B 6
61 C 7	2620 D 7	9561 C 4
62 F 5	2634 C 7	9562 A 4
65 A 8	2635 C 8	9563 A 8
70 B 5	2636 D 7	9566 B 6
71 F 1	2642 C 8	9569 B 6
1501 G 6	2644 D 6	9571 E 8
1503 D 8	2645 C 6	9572 B 7
1504 A 7	3502 E 5	9573 F 5
1505 D 1	3547 C 4	9580 F 5
1506 A 5	3565 D 7	9581 C 5
1507 E 2	3567 G 3	9584 E 6
1508 G 2	3579 D 3	9589 C 6
1510 B 3	3582 C 4	9590 B 8
1512 F 7	3583 C 4	9591 G 3
1513 B 3	3584 B 4	9601 B 7
1516 G 4	3587 C 4	9620 C 1
1520 D 6	3607 C 6	9621 D 1
1521 F 1	3631 G 4	9623 E 1
1522 F 2	3632 G 4	9624 D 1
1523 D 2	3635 B 8	9625 G 4
1524 A 5	3637 C 7	9626 G 4
1525 A 5	3690 B 7	
1530 B 2	5501 B 8	
1531 C 2	5502 G 3	
2503 C 5	5503 G 3	
2504 E 6	5504 G 3	
2505 C 4	6501 A 7	
2506 F 4	6502 B 8	
2507 D 4	6503 B 5	
2508 E 4	6504 G 4	
2511 D 4	6510 F 8	
2512 E 4	6511 F 8	
2515 D 7	7515 G 6	
2516 E 7	9503 E 4	
2517 D 4	9506 E 5	
2518 F 4	9507 A 4	
2521 B 6	9508 E 5	
2522 A 6	9509 E 5	
2533 E 6	9511 D 5	
2534 D 6	9513 F 8	
2541 E 7	9514 F 8	
2542 F 7	9515 C 6	
2543 D 8	9518 F 5	
2544 E 7	9519 G 8	
2549 C 5	9523 B 4	
2550 C 5	9524 B 4	
2575 F 3	9525 E 6	



This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

2501 C 4	2618 F 7	3528 D 6	3596 F 4	4502 D 6	4580 D 6	7514 F 3
2502 D 6	2619 D 4	3529 E 3	3597 B 7	4506 A 8	4593 C 8	7516 G 7
2513 D 4	2621 D 5	3530 E 3	3598 B 7	4508 G 4	4594 C 8	7517 E 6
2514 E 4	2622 E 5	3531 F 6	3601 D 5	4509 E 3	4600 A 3	7518 F 7
2519 E 7	2623 E 4	3532 E 6	3602 E 5	4510 G 5	4601 B 4	7519 E 7
2520 E 7	2624 E 4	3533 E 6	3603 E 7	4511 B 4	4602 A 3	7520 F 7
2523 D 6	2625 C 4	3534 F 7	3604 F 7	4512 D 8	4603 B 4	7521 D 6
2524 F 6	2626 C 4	3535 E 6	3605 C 4	4513 F 7	4604 A 4	7522 D 6
2525 C 6	2627 F 4	3536 F 7	3606 F 4	4514 B 4	4605 B 4	7523 C 4
2526 C 6	2630 C 7	3537 E 6	3608 C 6	4515 E 6	4606 C 5	7553 E 4
2527 D 7	2632 F 1	3538 E 7	3609 C 6	4517 B 6	4607 G 5	
2528 D 7	2637 C 7	3539 D 6	3611 E 7	4518 D 8	4608 E 4	
2529 D 7	2638 D 8	3540 F 6	3612 D 7	4519 B 4	4609 F 4	
2531 D 7	2641 B 4	3541 E 7	3613 E 6	4520 B 8	4610 F 5	
2532 E 7	2643 E 3	3542 F 7	3618 D 2	4521 A 7	4611 C 7	
2535 E 6	2646 D 6	3543 E 7	3619 C 1	4522 A 8	4612 B 6	
2536 F 6	2647 D 6	3544 F 7	3633 C 8	4523 C 4	4613 C 6	
2537 C 5	2648 D 1	3545 G 6	3634 C 8	4524 E 6	4614 F 5	
2538 C 5	2649 C 1	3546 G 7	3636 D 8	4525 C 6	4615 E 6	
2539 E 6	2650 D 2	3548 B 4	3639 G 4	4526 C 5	4616 D 6	
2540 F 7	2651 D 2	3549 E 6	3640 F 4	4527 B 7	4617 C 7	
2545 D 2	2652 D 1	3550 F 6	3641 E 6	4528 B 8	4618 D 3	
2546 E 2	2653 D 1	3551 E 7	3642 F 6	4529 G 6	4620 F 5	
2547 G 3	2654 C 8	3552 F 6	3643 E 6	4530 C 7	4622 B 8	
2548 G 3	2671 B 1	3553 E 7	3644 F 6	4531 B 4	4623 D 6	
2551 E 6	2672 B 1	3554 E 7	3645 B 6	4532 F 8	4624 D 6	
2552 F 6	2673 B 1	3555 E 6	3646 D 6	4533 B 7	4625 C 7	
2553 G 4	2674 B 1	3556 F 6	3647 E 7	4534 B 4	4626 B 8	
2554 F 4	2675 B 2	3557 D 7	3648 E 7	4535 F 7	4627 C 8	
2555 C 6	2676 B 2	3558 E 7	3652 F 1	4539 F 4	4628 E 5	
2557 G 2	2677 C 4	3559 E 5	3654 F 1	4541 B 8	4629 B 7	
2558 F 2	2678 G 2	3560 E 5	3655 C 7	4542 B 8	4630 B 6	
2559 E 5	3501 C 5	3561 D 7	3656 D 8	4543 B 6	4631 F 6	
2560 E 5	3503 F 5	3562 E 7	3657 C 7	4544 D 6	4632 C 5	
2561 D 4	3504 F 5	3563 D 7	3658 D 7	4545 B 7	4640 A 8	
2562 E 4	3505 B 5	3564 E 7	3661 B 7	4546 D 6	4641 A 8	
2563 D 6	3506 C 5	3566 D 8	3662 D 6	4547 B 4	4642 A 7	
2564 D 6	3507 C 6	3568 G 8	3663 D 6	4548 D 7	4643 B 5	
2573 D 1	3508 C 6	3569 F 4	3664 D 6	4549 C 4	4644 A 5	
2574 E 1	3509 C 6	3570 F 4	3666 C 8	4550 D 4	4645 B 5	
2581 D 5	3510 D 5	3571 D 1	3667 C 8	4551 D 7	4650 D 1	
2586 D 1	3511 C 5	3572 E 1	3668 C 8	4552 G 5	4651 E 1	
2590 E 5	3512 F 5	3573 D 5	3671 E 2	4553 D 5	4652 D 2	
2591 E 6	3513 C 4	3574 E 5	3672 E 2	4554 E 4	4653 C 5	
2592 F 7	3514 F 5	3575 G 6	3673 D 2	4555 G 4	4654 C 8	
2593 E 7	3515 D 4	3577 E 5	3674 E 2	4556 B 4	4656 D 1	
2594 F 7	3516 F 4	3578 F 6	3675 E 2	4557 G 5	4657 C 8	
2595 C 6	3517 D 4	3580 B 4	3676 E 2	4558 G 4	4660 F 7	
2596 C 6	3518 E 4	3581 E 3	3677 F 2	4559 D 3	7501 D 7	
2597 D 5	3519 B 7	3585 F 3	3678 F 2	4560 E 6	7502 D 8	
2603 E 3	3520 D 5	3586 E 3	3679 F 2	4561 F 8	7503 F 4	
2604 E 1	3521 C 6	3588 F 4	3680 E 2	4562 F 7	7504 F 4	
2607 C 4	3522 D 6	3589 A 8	3681 E 2	4563 E 4	7505 B 4	
2609 F 4	3523 B 6	3591 B 4	3682 E 2	4564 B 5	7507 C 6	
2610 G 4	3524 A 6	3592 C 4	3701 C 1	4569 D 5	7510 C 8	
2611 D 7	3525 B 7	3593 D 1	3702 B 1	4572 B 7	7511 C 7	
2612 E 7	3526 A 6	3594 E 1	3907 C 7	4573 B 7	7512 F 4	
2617 E 7	3527 C 6	3595 F 3	4501 D 5	4574 C 8	7513 E 3	



POWER & AMPLIFIER

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